

No.19/2

Working Paper

Sustainable work

The social-ecological transformation of the working society

Position paper of the Working Group „Sustainable work“
of the German Committee Future Earth

G. Jochum, T. Barth, S. Brandl, A. Cardenas Tomazic, S. Hofmeister, B. Littig,
I. Matuschek, U. Stephan und G. Warsewa

supported by

DFG



German Committee
Future Earth

Working group members and authors of the position paper:

Dr. Thomas Barth, Ludwig-Maximilian University Munich, Institute for Sociology, Chair for Social Developments and Structures (thomas.barth@lmu.de)

Prof. Dr. Sebastian Brandl, College of the Federal Employment Agency (HdBA), Schwerin Campus, Professor of Sociology, focussing on work sociology and social policy (Sebastian.Brandl@hdba.de)

Dr. Ana Cárdenas Tomazic, Institute for Social Science Research (reg. ass.) Munich (ana.cardenas@isf-muenchen.de)

Dr. Georg Jochum (work group spokesman), Munich Technical University, TUM School of Governance, Chair of Sociology of Science (g.jochum@tum.de)

Prof. Dr. Sabine Hofmeister, Leuphana University Lüneburg, Professor of Environmental Planning, Faculty for Sustainability (hofmeister@uni.leuphana.de)

Univ. Doz. Dr. Beate Littig, Institute of Advanced Studies (IHS) in Vienna. Head of the socio-ecological transformation research unit + Vienna University, Institute for Sociology (littig@ihs.ac.at)

Prof. Dr. Ingo Matuschek, College of the Federal Employment Agency (HdBA), Schwerin Campus, Professor of Sociology, focussing on work and social structure (ingo.matuschek@hdba.de)

Stephan Ulrich, International Labour Organisation, Geneva (ulrich@ilo.org)

Dr. Günter Warsewa, University of Bremen, Director of the Institute of Work and Economy at the University of Bremen (gwarsewa@iaw.uni-bremen.de)

German Committee Future Earth, Secretariat, c/o Climate Service Center Germany (GERICS), Helmholtz-Zentrum Geesthacht, Fischertwiete 1, 20095 Hamburg, Germany.

November, 2019

The views expressed in this publication are those of the authors. The publication does not imply endorsement by the German Committee Future Earth of any of the views expressed.

Recommended citation: Jochum, G.; Barth, T.; Brandl, T.; Cardenas Tomazic, A.; Hofmeister, S.; Littig, B.; Matuschek, I.; Stephan, U. & Warsewa G. (2019): Sustainable Work – The social-ecological transformation of the working society (2nd revised version). Position paper of the Working Group “Sustainable work” of the German Committee Future Earth. Hamburg.

Contents

Summary	P. 4
A. Introduction	P. 5
B. The guiding principle of sustainable work	P. 6
C. Main topics of a research agenda on sustainable work	P. 9
1. Changes in the relationship between paid and unpaid work	P. 10
2. Innovations and transformations in the employment sphere	P. 13
3. The global relationships of the working society	P. 15
4. Digitalisation of work and sustainable work	P. 18
5. Governance of social-ecological transformation	P. 20
D. Transdisciplinary research for sustainable work	P. 23
Literature	P. 26

Summary

This final report of the work group (WG) “Sustainable Work” in the German Committee for Sustainability Research (DKN) in Future Earth focusses on the presentation of key points, central topics and questions that are part of a research agenda on sustainable work and the related socio-ecological transformation of current working societies. With this, the WG joins international and national discourses on the Sustainable Development Goals and their implications in relation to work. The concretisation of sustainable work of the 2015 UN Human Development Report in particular is a central reference point with the team’s efforts to develop an integrative model: sustainable work is understood in a broad sense as socially necessary work (including gainful employment, unpaid care work, voluntary/civic engagement and creative activities) which is conducive to the development of human capabilities of current and future generations. A prerequisite for this is avoidance of socio-ecological negative effects (temporal and spatial) on both external nature and humans’ ability to do work and their working conditions (decent work).

Thus, the research task in this area is analysis of socio-ecological transformation processes and dynamics of modern-day work societies, with consideration of their historical and global contexts. With this, the specific objective of the transformation must also be clarified, along with the causes and driving forces, actors, phases and consequences. On the basis of this, it is appropriate to identify development paths for sustainable work societies and the requirements and obstacles recognised with them.

As key topics of a research agenda for sustainable work, the WG identifies the following themes:

1. Changes in the relationship between paid and unpaid work
2. Innovations and transformations in the employment sphere
3. Global relationships in work societies
4. Digitalisation of work and sustainable work
5. Governance of socio-ecological transformation

The research on socio-ecological transformation of a working society requires both interdisciplinary and transdisciplinary research organisation and appropriate scientifically structured framework conditions. On a methodical/methodological level, the WG sees a need for developments with a view to conducting socio-material analyses, measurements and indexing, and scenario development.

A. Introduction¹

The current working society is undergoing a profound change, thanks to several transformation processes: digital transformation is changing the ways in which work is monitored and organised, leading to changes in required work skills. Demographic development, as well as global migration movements, significantly impact the count and formation of the working population. The increasing flexibility of work goes hand in hand with the delimitation of work and life, which also changes the relationship of gainful employment with other forms of work, where there is no payment. Economic globalisation is leading to increased establishment of global supply and labour chains and new, transnational dependency ratios. These developments, and the question of how one can “transform work” (Commission on the work of the future 2018), are issues which are today widely discussed in many committees. However, in most of these debates a central void can be seen: the ecological aspects of work are largely left out.² At the same time, a focus on customers and companies as central actors is also something to be brought up in sustainability discourse – normally, the workers and their concrete activities are not considered.

The aim of the WG “Sustainable Work” is to contribute to the discussion of sustainability, thus helping to close this sustainability gap in current discourse on the future of work. The development dynamics outlined above will be linked to socio-ecological transformation, and it should be investigated whether they aggravate the socio-ecological crisis or if the interactions could be associated with positive synergy effects. After this, socio-ecological transformation scenarios should be discussed in a context of pursuit of a sustainable working society and the resulting research questions should be identified.

As part of this we join a debate on the relationship between ecology and work – a debate which has already been conducted for a longer period but it has only expanded again in recent years (cf. inter alia Brandl and Hildebrandt 2002; Docherty/ Kira / Shani 2009; ILO 2013, 2015; Barth, Jochum and Littig 2016a; Rätzl/Stevis/Uzzel 2018). We also refer to the “Sustainable Development Goals” that have been agreed on in the UN Agenda “Transforming Our World” (UN 2015) as well as the UNDP report “Work and human development” (UNDP 2015). This report calls for a transition and “moving to sustainable work” (ibid.: 129), with reference to the Sustainable Development Goals and their manifold significance in the world of work. Goal 8 “sustainable economic growth, full and productive employment and decent work for all”, is highlighted in particular, but objectives 2, 3, 5 and 9 are also relevant (cf. UN 2015; UNDP 2015: 18ff.).

To follow up on this, the work group (WG) is exploring key research issues in relation to sustainable work. From the perspective of the WG, the transition to sustainable work should be conceived as a comprehensive social-ecological transformation of the working society that goes far beyond technological and economic innovations. The research must have two objectives: a) to conduct analyses of current socio-ecological transformation, and b) to examine the conditions and possibilities of potential development paths toward

¹ An initial version of the position paper was discussed with scientists and stakeholders at the round table meeting of the WG on 21./22.6.2018 in Berlin. We would like to warmly thank the participants for their diverse, valuable suggestions.

² This also applies e.g. for the report “Future of Work, Future of Society” of the “European Group on Ethics in Science and New Technologies” (2018) or the “White Book ‘re-imagining work’” of the Federal Ministry of Labour and Social Affairs of Germany (2017)

sustainable work. To this end, first the main features of the integrative guiding principle of sustainable work are presented. This opens up a broad field of research topics which have so far been discussed and dealt with only inadequately and in an incoherent manner.

B. The guiding principle of sustainable work

The guiding principle of sustainable work is focussed on enabling decent work and the preservation of the natural and social foundations of work in the future. The UNDP report defines it as follows:

“Sustainable work is defined as work that promotes human development while reducing or eliminating negative externalities that can be experienced over different geographic and time scales. It is not only critical for sustaining the planet, but also for ensuring work for future generations.” (UNDP 2015: 37)

This definition of sustainable work is based on the designation of sustainable development in the Brundtland Report (WCED 1987); however, the focus is not one of satisfying needs; rather, the “dual mutual goal” (UNDP 2015: 37) is one of pursuit of work which is both *ecologically sustainable* and *conducive to human development*. Thus we see the establishment of a multi-dimensional orientation framework, which is why measures for tackling conflicting goals are also required.

The model of sustainable work should be viewed as a regulative idea which is to be substantiated with concrete meaning and content in political, scientific and public discourse. The WG intends to contribute to the further development of this model and to derive relevant research questions based on the same. In the following are listed what we consider the central aspects of the model:

1) Sustainable work is linked to the objective of creating the conditions for **decent, development-enhancing work** in all countries and sustaining them in the long run. This is underpinned by the assumption “that work can enhance human development when policies expand productive, remunerative and satisfying work opportunities, enhance workers’ skills and potential and ensure their rights, safety and well-being” (ibid.: 1).

The objective of sustainable work is close to the concept of “Decent Work” of the ILO, insofar to the orientation to the subjects’ needs and potential is the starting point. With this, development is not reduced to economic aspects; rather, it should “maximize human choices” (ibid.). Thus, the UNDP report is based on a broad understanding of development, which is influenced by the Capability Approach (Sen 1993; Nussbaum 2011).

2) At the same time, the objective of **ecological sustainability of work** is combined with sustainable work. This is the prerequisite for enabling both current and future generations to practice work which is decent and life-assuring. Decent work and productivity is possible in the long run only if it doesn’t mean that the (re-)productivity of nature is jeopardised. What is particularly necessary is consideration of the load capacity of the ecological systems the limits of which have already been partially exceeded (ibid.: 137). Thus, the sustainable work model postulates the minimisation of negative ecological side effects of

work, in order to sustain the (re-)productive abilities of nature as a basis for human life and work in the present and in the future and thus guarantee intragenerational, and intergenerational, justice.

From the perspective of the WG, an addition should be conducted here, with the explicit inclusion of the objective of sustainability of people's "inner nature" along with the material and immaterial foundations of individual work. Work must be customised such that the preservation of reproductive ability recognisable in human endeavour and life force, is also guaranteed (cf. Barth/ Jochum/ Littig 2016b) – this is the only way to ensure that decent work conducive to development is also possible.

3) In contrast to a narrowing down of work to gainful employment (as can be partially stated in the debate on ecological jobs and green jobs (ILO 2013)), the concept of aims the **sustainability of all (re-)productive activities**. In this sense, in the UNDP report it is implied that „from a human development perspective, the notion of work is broader and deeper than that of jobs or employment alone“ and also includes “care work, voluntary work and such creative work as writing or painting” (UNDP 2015: 3).

Following up on this, the WG explicitly applies an expanded concept of work, which includes not only market-oriented gainful employment but also, in addition to the activities mentioned, caring work, precautionary work and self-sustaining work. A concept of work expanded in this way, which revolves around the category of “(re-)productivity” (Bies-ecker and Hofmeister 2010)³, also implies that these activities cannot be regarded as additive; rather, their interactions are to be considered in their change dynamics. Hierarchies frequently associated with the separation between formal and informal labor or marketed and non-marketed work must also be problematised.

4) The objective of sustainable work must be conceived as an integrative idea. A mere transfer of the so-called three-pillar conception of sustainability is not sufficient for this. After all, an isolated application of the concept of sustainability to the subsections of ecology, economy and social affairs ultimately counteracts an integrative claim which regards them as parts of an entity. In particular, an isolated view of “economic sustainability” (in the sense of reduction of economies to economic value) is to be regarded as shortened. If work (in the sense of an expanded concept of work) is regarded as a central “economic” mediator between society (social) and nature (ecology), this also implies an expanded notion of economics. To our understanding, the domain of economics is an expression of the entire domain of people's interaction with nature. The objective of **sustainable work in a sustainable economy** is, from the point of view of the WG, generally to be associated with the preservation of possibilities for (re)productive interaction of people with each other and with nature.

³ With this terminology and spelling, the authors clarify that there is no separation ratio between “productive” and “reproductive” activities in material-physical terms. Economic services are constructed and reconstructed solely via externalization (social life and natural).

5) Summary: the transition to sustainable work requires a socio-ecological transformation of the working society.

The guiding principle of sustainable work provides general criteria for a transformation process of social organisation of work. Exactly which measures such a change requires, and what effects it will have, is only hinted at in the UNDP report – the focus is primarily on a technological change toward more energy-efficient and resource-efficient forms of work as part of a transition to a Green Economy. The WG finds that technological innovations play an important contribution on the path to sustainable work; however, it assumes that a comprehensive transformation process is necessary. The following topics must also be put up for discussion: the structures of (global) division of labour, the relationship between the commercial and the non-commercial spheres, the distribution and protection of income and recognition, the working hours, the mobility associated with work, the governance of the work systems and also the societal (re-)production conditions. A comprehensive socio-ecological transformation of work societies – on a regional as well as on global level - is necessary for a transition to sustainable work.

C. Main topics of a research agenda on sustainable work

The **scientific contribution to a socio-ecological transformation of a working society** lies first and foremost in the analysis of current transformations of work, taking into account the historical and spatial differences in the change. As part of this it is appropriate to also clarify the objective of the transformation (what?), such as the causes and driving forces (why?), the actors (by whom?), the phases and forms (how?) and the consequences: “Thus, the purpose of transformation research is to analyse these complex transformation, conversion and transition processes (which are differentiated from each other) from types of social order and socio-economic and socio-cultural development paths. It essentially involves searching for what is possible. The future in the here and now.” (Reißig 2012: 15; own translation) The latter, with regard to potential sustainable development of work societies, involves identifying possible development paths, and their conditions and obstacles.

In **sustainability research funding** to date, the connection between ecology and work in general and sustainable work in particular, is only of marginal significance. Indeed, as a consequence of the debates on a transition to a Green Economy, national institutions have funded projects which cover topics related to the goal of sustainable work.⁴ However, this did not put into motion any comprehensive research on changes in the world of work which went beyond special Green Jobs and especially ecologically oriented companies. The conflict area of paid work and forms of unpaid work and activities with a focus on sustainability issues has also been established as a central theme only to a limited extent to date. When it comes to research funding at a European and global level, as well, the subject area of work and sustainability has been handled – if at all – only as a partial aspect of other superordinate topics, such as climate change, digital transformation or

⁴ As an example from Germany is to be mentioned the “Förderkonzept für gesellschaftsbezogene Nachhaltigkeitsforschung 2015-2020 (Promotional Concept for Societal Sustainability Research 2015-2020)”, which, in connection with “sustainable economics”, also supported research on employment-related sustainability aspects (BMBF 2015: 18). Although, the concentration on “consumers and businesses as key players for sustainable transformations” also makes it clear that, to date, work and employees have not systematically come into focus. In “Green Economy Research Agenda” of the BMBF, a change in work content and qualifications was brought about by an ecological modernization of paid work in all sectors (BMBF 2014).

sustainable economics.⁵ At a global level work has been relevant preeminently in connection with a transition to sustainable growth and the promotion of Green Jobs.⁶

Consequentially, to date, work-related sustainability criteria have become the subject of research funding only to a fragmentary, unsystematic extent. An explicit concentration of research programmes on the transformation of work societies at the central level of sustainability transformation has remained a desideratum. However, the WG considers it necessary to position socio-ecological transformation of working society at the centre of political programmes and of academic research. We consider the guiding principle of sustainable work appropriate for promoting an integrative perspective. As a result, a variety of issues receiving attention which, to date, have been disregarded. A complete list of the relevant problem areas would go beyond the scope of this paper. For this reason, in what follows we would like to focus on these central guiding topics of a research agenda aimed at sustainable work:

1. Changes in the relationship between paid and unpaid work
2. Innovations and transformations in the sphere of paid work
3. The global relationships of a working society
4. Digitalisation of work and sustainable work
5. Governance of socio-ecological transformation

1. Changes in the relationship between paid and unpaid work

1.1 Changes in the relationship and their impact on sustainability of work

The model of sustainable work focusses on the sustainability of all (re-)productive activities. The WG applies an extended work concept in which the category of (re-)productivity (Biesecker und Hofmeister 2006; 2010) lies at the centre. This implies that the changing relationships – the interactions, the interwoven elements, the breaks and the hierarchies recognised therein – between paid work and unpaid work⁷ and the resulting socio-ecological effects and potentials, become a subject of research.

⁵ In the Horizon 2020 programme, sustainable work is promoted by the thematisation of relevant aspects, especially in connection with resource-efficient production forms with the aim of averting climate change (Available at: <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/climate-action-environment-resource-efficiency-and-raw-materials>; accessed on 3.4.2019). In the four major focus areas stated for the period 2018-2020, there are recognizable connections to sustainable work with the programme points “Building a low-carbon, climate resilient future” and “Connecting economic and environmental gains – the Circular Economy” in particular. In the focus area “Digitising and transforming European industry and services”, too, there are stated opportunities for supporting sustainable production forms using new technologies. However, there is a predominant, strongly technology-centered perspective, with an absence of an additional socio-ecological change with the working society. (Available at: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-intro_en.pdf; accessed on 2.4.2019).

⁶ This is what the central focus of the Sustainable Development Goals is (UNO 2015).

⁷ The demarcation between the forms / domains of work is diverse, and not unique: “paid” is different from “unpaid”, “public” different from “private”, “formal” different from “informal”, “paid work” different from “voluntary work”, “production work” different from “reproduction

As part of this, it is possible to refer to various former studies and approaches in which an industrial society focus on gainful employment in connection with sustainability has already been problematised⁸: At the turn of the millennium, the project “Work and Ecology” (HBS 2001) dealt systematically with this topic. The combination of different activities with different design principles was investigated. and with the concept of “mixed work”, work beyond gainful work was also included in the analysis (Brandl and Hildebrandt 2002). If sustainable work, in the sense of preservation of the reproductive capacity of society and nature, becomes a central reference point in the debate, then it is appropriate to call into question the social and ecological implications of unpaid reproduction work. This includes the power gap between the different forms of work and the socio-ecological crisis phenomena that result from situations of inequality – the “crisis of reproductive work” (Rodenstein et al. 1996), as well as the so-called ecological crisis phenomena. As part of this, the problematic consequences of current development trends in the paid work sphere (in particular: the subjectification and de-limitation of work) for reproduction capacity in subjects’ working and life force, as well as in non-human “nature”, become visible and systematically thematised for the sake of a critical sustainability analysis.

Following feminist debates about an extended concept of work, a wealth of scientific approaches has emerged, on which research into sustainable work may be based. The central factor here is the time dimension (cf. e.g. Brandl and Hildebrandt 2002: 89ff.; Biesecker 1999⁹) – enforcement of the industrial economy is coupled with lifestyle rationalisation (inter alia Littig 2017) and the related health consequences and effects on the environment.

1.2 Research fields

Extended work concept and analysis of debates

The clarification of terms and classification of the debates on “paid work”, “reproduction work”, “care”, “volunteering” and “alternative” or “new” work forms are necessary to make the changing relationships between gainful employment and unpaid work and their socio-ecological implications a matter of research.¹⁰

- How is the continuum (interactions and connections) between paid work and unpaid work changing? Which “intermediate forms” are developing (e.g. “prosumers”, “care chains”, voluntary activities, and new usage forms, such as sharing of

work” (and, in addition to that, “care work” different from “own work”, “housework” and “educational work” and “care work” different from “community work” etc.). For the purpose of avoiding ambiguities and inconsistencies, we differentiate between “paid” (economically valued) and “unpaid” (economically externalised, yet materially internalised) jobs and socio-ecological services.

⁸ The debate on sustainability with this topic, which has existed since the 1990s, was able to build on a long feminist tradition of debates in the new women’s movement, as well as in research on the subjects of women and gender (an example in the case of German-speaking countries: Beer 1984).

⁹ From a sustainability science perspective, as far as this is concerned, one can refer in particular to socio-ecologically oriented empirical studies on time usage (Adam 1998).

¹⁰ This includes analyses on conceptualisation of paid work and other areas of activity, such as “volunteering” and approaches with “Good work” (Littig 2018) or “Good life” (Netzwerk Vorsorgendes Wirtschaften 2013), as well as the post-growth debates.

goods and services)? How do the different logics (market and non-market) interact, and how are they demarcated?

- How are the dominance ratios changing (e.g. between the sexes and in terms of time), and also power gaps between the different work spheres (including in spatial terms, for example between employees from industrialised countries compared with countries in the Global South and Eastern Europe)? How are dominance and power relations changing in the course of further development of social security systems, starting from the coupling of livelihood security (income and social-/pension systems) with paid work and ecological policies (e.g. in the “energy transition”)?

Socio-ecological effects of changes in the relationship between the working spheres

The shifts between paid and unpaid forms of work must be investigated for their sustainability potential. Also of relevance here are details of the socio-ecological effects brought about by unpaid forms of work not recognised under market logic and the details of those which are changes in paid work.

- What are the consequences of the trends recognised with intensification and subjectivisation in paid work and the movement “from employee to ‘entreplooyee’” (Pongratz/ Voß 2003 2003)? What are the implications of an extended occupation of the person for gainful employment on unpaid work (and on “inner nature”)?
- What influence do socio-technical developments (e.g. digitalisation) have on hybridisation of working spheres, shifts, inclusion/exclusion of (paid) work and shifts in dominance and power relations in these processes?
- What influence do sociodemographic factors have on the distribution of work in and between the work spheres e.g. birth count in countries in the Global South compared with industrialised nations in the Global North and on gender and intergenerational justice?

Socio-ecological transformation of “work”

Expansion of the view to unpaid work via an extended work concept has implications on transformation scenarios. Likewise, a socio-ecological transformation changes work qualities and volumes in both areas of work (paid and unpaid).

- How “sustainable” are new work forms originating between paid work and unpaid work? And who are the (promoting or inhibiting) actors of socio-ecological transformation in a “hybrid” world of work (e.g. “Share Economy”, “Repair Cafés”, “Solidarity Agriculture”)? What contribution to transformation toward sustainable work do they make, and what qualifying and infrastructure requirements result from it? How can transformation processes be formed by hybrid and non-paid work?
- What effects could develop from an unconditional basic income, including in the perspective of multiple generations? Does this create room for new forms of unpaid work? How do paid work (working hours, income, recognition) and the ratio of the different forms of work change as a result of it? How does this affect social

integration? What monetary and temporal effects arise? What can be learned from model projects and experiments?¹¹

2. Innovations and transformations in the paid work sphere

2.1 On the significance of transformation in paid work

The paid work sphere is dominant in modern labour societies, making it an essential field of transformation in the transition to sustainable work. It is necessary to mention the existence of major research contributions, and the support offered on this score by research promotion institutions (see above) as far as this is concerned. However, a focus on technical aspects is still often predominant; on the other hand, often only partial areas of the change in gainful employment come into view. A systematic development of the research field has just begun (Docherty/ Kira / Shani 2009; Barth/ Littig/ Jochum 2019).

A comprehensive analysis of the non-sustainability of current work requires a detailed investigation of the material-related and energy-related consequences of the various forms of work, for the purpose of identifying socio-ecological transformation needs and exploring potential for innovation and transformation. In accordance with the integrated socio-ecological objective of the sustainable work model, social compatibility and fair design comprise an indispensable prerequisite with the necessary transformation processes. As has also been made clear in the UNDP report, the path to sustainable work doesn't just mean the development of new employment positions and earning opportunities; it also means the termination or transformation of ecologically problematic employment positions (UNDP 2015: 14). Consequently, concepts of a socio-ecological transformation of the working society must consider the social life implications of the change, in an integrative sense. Thus, political processes initiated in the pursuit of environmental sustainability also require a democratic integration of all involved parties to facilitate a "just transition" (ILO 2015). This is the only way to guarantee that the parties involved in the transformation processes are able to play an active role in shaping things, which in turn will also guarantee their social acceptance.

2.2 Research fields with the transformation of the domain of paid work

Ecological conditions and effects of current paid work

Ecological sustainability is a central element of sustainable work and the prerequisite for ensuring that future generations too can continue to practice decent and life-affirming work. What's necessary is the systematic development of a research arrangement which acknowledges the ecological bases and effects of work in order to derive from its implications for socio-ecological transformation processes. In this regard, there exists the following research questions (inter alia):

¹¹ Learning from examples: what favours and what hinders (e.g. trade regulations) the development of sustainable work? What effects do experimental fields and real laboratories have? Where has (more) sustainable work been enabled, and how? What can be learned from ingenious examples?

- Which kind of consumption of resources is associated with the various work forms and the output of work? What opportunities are there for determining the ecological footprint of jobs, and what implications would this have for the applied political arrangements and those involved?
- Alongside the ecological effects of work, the inverse effective direction also comprises an important topic: what effects do global environmental changes have on work? How does e.g. climate change alter the conditions of future work?
- Which social-ecological models or theoretical concepts can adequately grasp the interaction between societal systems of labor- and production and the productivity of natural systems?

Socially acceptable transformation of paid work

The transition to ecologically sustainable work must take place subject to consideration of the objective of social compatibility and the preservation of the potential for human development. The following research questions arise (inter alia):

- Under what conditions do conversion processes lead to increases or decreases in socio-ecological inequality? What transformation scenarios can develop which consider differing allocation of resources on a social structure level and one's being affected by certain measures as well as power asymmetries?
- What effects do socio-ecological transformations have on changes with social security systems and vice versa?
- What kind of role is played by various forms of interest groups and the participation of involved parties in the world of work in the transformation toward good and sustainable work (cf. Urban 2018)?
- What are the effects of socio-ecological transformation of paid work on the domain of unpaid work and, consequently, life in general (cf. Littig 2017)?

The employees as protagonists of transformation?

The concept of sustainable work also focusses on the potential and resources of the employees who, in this way, are acknowledged not just as parties affected by transformation but also as possible protagonists in socio-ecological transformation processes (cf. Becke/Warsewa 2018). There is an essential question to be acknowledged here: the question of under what conditions the employees can develop such potential, and which new qualifications become necessary. It all means that vocational training is of key importance for an ecologically expanded work and professional ethic. It is necessary to pose the following research questions (among others):

- How do the employees perceive the ecological dimensions of their work? Do the increasing demands for meaningful work lead to the fact that the employees actively participate in the social-ecological transformation of the working world?
- What implications does the socio-ecological transformation have on the transformation of jobs? What new skills and jobs are necessary for the transfer to sustainability? In the future, could there possibly be an increased need for skilled workers to help cope with the consequences of non-sustainable work?
- How do vocational training and academic education need to change for the sake of the provision of knowledge for sustainable work?

Economic framework conditions of sustainable work

The employees, and the companies alike, can contribute to a transition to sustainable work; however, at the same time, they are integrated in overall economic framework conditions, which may have enabling or restrictive aspects. With this, there exists the following questions concerning the structural prerequisites for a socio-ecological transformation of the wage labour society:

- Which structural conditions, interests and power relations prevent a transition to more sustainable economics and work?
- What contribution is offered by strategies which follow the Green Economy, Sustainable Growth and Green Growth models, toward the realisation of the guiding principle of sustainable work? What restrictions are noted with these strategies (which tend to be technical-centred and growth-oriented)?
- Are alternative economic models – e.g. concepts of a circular economy, a bioeconomy, a precautionary economy, a solidary economy or a post-growth economy (cf. Koeppe et al. 2015) – capable to create framework conditions for more sustainable forms of work with new forms of resource use, an appreciation of unpaid work and a break with the logic of growth?

3. The global relationships of the working society

3.1 On the significance of a global perspective with the socio-ecological change of the working society

With the guiding vision of sustainable work, the global relationships of the working society become the focus of attention. To meet the postulation of intragenerational and intergenerational justice, socially and ecologically harmful consequences of work in the so-called industrialised countries must be avoided in work in developing countries and the often precarious and indecent working conditions in the so-called Global South must be improved.¹²

Efforts to enforce international social, environmental and human rights standards along global supply chains, and fair trade and labour regulations, are a subject of key importance in this context. In view of international division of labour, it becomes necessary to undertake systematic research of ecological and social framework conditions and the consequences of concrete work activities in global supply and value chains. Efforts have already been made in such a direction in recent years, and the required accompanying scientific research here has begun, such as e.g. research on sustainability in value chains for textiles,

¹² We understand the concept of the Global South as defined by Sousa Santo: “The global South is not a geographical concept, even though the great majority of its populations live in countries of the Southern hemisphere. The South is rather a metaphor for the human suffering caused by capitalism and colonialism on the global level, as well as for the resistance to overcoming or minimising such suffering.” (De Sousa Santo 2016: 18-19)

cocoa and conflict minerals.¹³ Comprehensive research on the socio-ecological prerequisites and effects of the global working society, however, remains a desideratum.

However, a reduction of the perspective on the social-ecological optimisation of global supply chains would be but a shortened one. These should also be analysed as a result of (dependency) structures which have grown over history (Wallerstein 1974; Quijano 2000). There is a tense relationship between global supply chains and national and regional economies. In addition, formal paid work is to be regarded as only one part of work. After all, informal work, which often offsets the demand fluctuations of the formal labour market, is of particular significance with the livelihood of many people, especially in the Global South (cf. Cerda-Becker, Sittel and Schmalz 2015). The relationship of these domains to each other has in recent decades shifted in the direction of increasing significance of paid work embedded in transnational economic contexts in the course of globalisation. At the same time an increase in the relevance of informal work for lower classes can be stated. An integrated investigation of the socio-ecological effects of these shifts is pending.

3.2 Research fields in the transformation of the global working society

How does the kind of work performed in the 'Global North' affect the 'Global South' (and vice versa)?

The work performed in the Global North has significant, frequently negative effects on work and life conditions in the Global South; however, they are mostly repressed and externalised (Lessenich 2016; Brand/Wissen 2018). Any research on sustainable work which considers the objective of intragenerational justice, must make such connections explicit.

- What is the status of the transnational relationality between national working societies with regard to socio-ecological exchange processes?
- What effects have environmental changes which have already been caused by production and consumption habits in the North, had on work opportunities in the South (e.g. drought due to climate change)? What kind of labour migration is already causing this right now, and what kind of developments are to be expected in the future?
- How should structural changes in the global working society be assessed on a socio-ecological level for the sake of sustainability? Is it possible that measures in the Global North could also lead to a shift of production which is problematic on social and ecological levels, to the Global South – and what repercussions would this, in turn, have on work in the North?
- How should the structural framework conditions of the global working society, and its institutional governance, be assessed and formed from a sustainability perspective?

¹³ By way of example, the “Garment Supply Chain Governance Project” on textile supply chains can be mentioned. Available at: www.wiwiss.fu-berlin.de/forschung/Garments/index.html.

The enforcement of sustainability standards in global supply chains

The creation of sustainable supply chains is crucial when it comes to complying with international social, environmental and human rights standards in the world of work. Science can support relevant undertaken efforts in the form of critical accompanying research.

- What kind of governance is necessary for checking labour standards in supply chains? What can be learned about the arrangements and checking of supply chains (e.g. textiles alliances) from example projects? The purpose of the research is closer examination of the interdependencies between the control mechanisms and contribution to the development of new concepts of mixed government.
- How can the transparency of the supply chains be increased? What sources of lack of transparency (e.g. market mechanisms, antitrust) can be identified? What contribution can the digitalisation of governance make to global supply chains?
- What ambivalent consequences of increasing control need to be considered? How is it possible to e.g. prevent power imbalances between the North and the South from becoming intensified with the application of social and environmental standards? What kind of significance does granting authorisation to workers and involvement of civil society have in this regard?
- On which care chains are supply chains based? How can this mostly unpaid work be sustainably organised?
- What new assessment of the sustainability of supply and work chains is there on the basis of an extended concept of work which takes the whole mode of living into account?

Interaction between globally oriented employment and other forms of work in the Global South

The focus on the design of global supply chains tends to neglect ambivalent effects of integration in global markets and subordination below the modern Western development and economic model. This could lead to the ruination of traditional local/national economies, work relationships and work forms. Research into sustainable work focusses on the socio-ecological effects of these processes, including an historical and culturally sensitive perspective.

- What are the socio-ecological effects of international division of labour? What are the historical roots of current inequalities and dependencies in the modern world system?
- Does increasing marketisation of work and nature lead to a promotion or reduction of development potential in the Global South? What is the ratio of formal/informal work? What related socio-ecological effects are there?
- Can a revaluation of locally or regionally oriented economies contribute to work which is more socially and ecologically sustainable? Or is any given job conducive to human development more a thing to be guaranteed through integration in global supply chains because this means that people in the South can escape poverty and dependency on subsistence economy in this way?
- What contribution can non-European perspectives make to development and work? How should non-Western work, life and economy models (e.g. the concept of “Buen Vivir”, Confucian or Buddhist ethics etc.) be valued with regard to socio-

ecological effects on work? How should they be (possibly) integrated in an intercultural perspective, in order to allow for consideration of work forms and conceptualisations of people-nature relationships of other cultures and inspire suggestions for the current socio-ecological transformation?

4. Digitalisation of work and sustainable work

4.1 The significance of digitalisation for the socio-ecological change of the working society

Alongside the ecological challenge, the so-called digitalisation can be regarded as the central driving force for the change to the world of work. The extent to which digitalisation could lead to smarter, resource-saving production, or is connected to an increase in global material flows and an increased energy consumption (Pilgrim et al. 2017), is also largely unclarified, just like the question of whether or not a continued economic growth will (over-)compensate the technical efficiency gains. Another uncertain factor is how predicted consequences of digitalisation, like job losses or changes to the world of work (cf. Matuschek 2016) relate to sustainability goals. Does it, despite the envisaged human centering of new technologies, lead to an increase in “indecent” work, which contradicts the sustainable work model, or could new, participatory forms of work emerge? The question of whether or not new forms of work and production (enabled through data and algorithmisation) could be capable of providing products and services beyond both traditional business and market forms and promoting a more sustainable economy (e.g. Sharing Economy etc.), is not just a question of technology, but also its application - which is known to be interest-led. This means that digitalisation of work is to be understood as a socio-technical transformation per se. A discussion on the connection between digitalisation and sustainability, which debates both material-energetic and social aspects, has only begun (cf. inter alia Lange and Santarius 2018; Politische Ökologie 2018; Sühlmann-Faul and Rammler 2018; WBGU 2019; Jochum and Matuschek 2019). A systematic analysis of the effects on work it is still largely a desideratum.

4.2 Research areas on the digitalisation and sustainability of work

Material and energy requirement of digitalisation

Digitalisation could possibly contribute to smarter, resource-saving production; however, one should not expect dematerialisation. Rather, the production of the digital infrastructure and its application (which follows the imperative of increasing speed) is associated with a (presumably increasing) resources and energy consumption, which, in all likelihood, should be examined as a matter of fundamental importance in connection with work sustainability.

- Could digitalisation possibly increase the need for specific resources (e.g. rare earth), the extraction of which is associated with socially and ecologically problematic forms of work (e.g. work with children)?
- Does the substitution of human work with digital devices lead to a reduction or an increase in resources consumption?

- Does work in the domain of recycling or disposal of digital technologies comply with the relevant social and environmental standards (especially with regard to the global South). What might the effects of digitalisation e.g. via supply chain control in this regard be?
- Which policies are appropriate for pricing ecologically real digitalisation prices (energy, raw materials etc.), and what consequences does this have for production and work?
- Are peak oil scenarios also to be expected in the future with regard to other digitalisation-relevant resources, and which should be detected early as development dead-ends as a result of the same? What about potential conflicts over indispensable raw materials for digitalisation?

Effects of digitalisation on quality of work

Digitalisation affects the human-technology relationship. With this there are various relevant connected questions relating to the sustainability goal of good work which is conducive to development, inter alia:

- Does digitalisation increase the autonomy of employees or does it lead to more autonomy and control? What ratio of control and self-determination does digitised work require to be sustainable?
- Does algorithmised control promote alienation tendencies? Could this result in an increased access to human nature (keywords: cyborgisation, hybridisation)? How could human potential develop in technical environments (digital learning worlds; algorithmisation vs. action sovereignty etc.)?
- Is social sustainability in work jeopardised by substitution of jobs or polarisation of the working world as a result of digital transformation?
- Do digital communication streams allow for a broader understanding among employees as a basis for social sustainability, and does this increase their potential or does it hint at an atomised world of work which leads to an increased isolation of employees?

Does digitalisation promote sustainable work?

With existing digital technologies, there are hopes of the emergence of sustainable forms of production and consumption. It is worth investigating the chances and risks recognised with these innovations for a reorganisation of work, as well as their conditions of origin, both in terms of their isolated dimensions recognised with specific cases and systemic dimensions.

- Does digitalisation contribute to more sustainable production and service work beyond traditional business and market forms?
- To what extent can Sharing Economy work models, enabled/facilitated by digitalisation, have resource-saving effects, and where are they lagging behind such expectations (and why is it like that)? Are risks of new forms of exploitation and control of the workforce, as well as risks of ecological rebound effects, also related to the platform economy?

- To what extent can digital technologies contribute to a redefinition of the relationship of gainful employment and other forms of work and thereby enable a more sustainable lifestyle?
- Can digital technologies support monitoring of the compliance of social and environmental standards in value chains e.g. via blockchain technologies, and what about their balance?
- Digital technologies are increasingly linked to technological innovations in other sectors e.g. bioeconomy and satellite technology. This goes hand in hand with the promise of creating new, smart forms of production and work which are worth investigating: does Smart Farming ensure more sustainable production and work in the context of a high-tech agriculture – or will a possibly more sustainable small-scale agriculture be endangered in the overall balance?

5. Governance of socio-ecological transformation

5.1 The significance of governance

In order that the social function of work as a central (re-)production and integration factor may be guaranteed in the long run, under the conditions of increasing scarcity of resources and the endangerment of global livelihoods a major change in employment systems is essential. In view of their worldwide interdependencies, socio-ecological transformation of work demands multilateral regulation and coordination. With this, the WG concurs with the UNDP that it is an important political task to handle the conversion of the global working society.¹⁴ Regarding the governance of sustainability transformation, there already exists a wealth of theoretical considerations and empirical research results (cf. inter alia Scheer 2006; WBGU 2011; Brand 2017, Lange 2017). However, to date these considerations have hardly been related to questions related to management of the working world.

This means that essential control, regulation and coordination services – which are also important from a sustainability perspective – remain unconsidered. With this, at the level of national paid work systems, a whole wreath of institutions – from the labour market and social legislation on labour law and family and tax policy, the tariff system and collective labour relations right up to chambers, associations and authoritative bodies – provides the framework conditions behind the concrete design of work execution, work organisation, work market processes, labour disputes etc. The manifold control and regulation functions of this institutional arrangement are an expression of social norms, and they effectuate their dissemination and solidification. On a path of reproduction and generalisation of normative foundations, as well as the concrete design framework, the governance of the employment system consequently shapes the reality of the working world (cf. Dingeldey/Holtrup/Warsewa 2015).

In this respect, the governance of the employment system plays a central role in its transformation as per the aforementioned guiding principle of sustainable work (cf. Chap. B). One central prerequisite for social values, institutions and practices in the domain of the

¹⁴ The report states: “Because moving to sustainable work will lead to jobs being lost, transformed (the majority) and created, public policies will be crucial in managing and facilitating change. Multiple stakeholders will have to work collaboratively— and globally.” (UNDP 2015: 176)

world of work being increasingly oriented to the requirements of socio-ecological transformation and sustainable arrangements, is the targeted transformation of such institutional arrangements, which play a decisive role determining the social function and organisation of work – and, with it, its social and ecological effects as well.

Against this background, the structures and functions of the governance of the employment system should be brought into question as to whether or not, and to what extent, they are capable of contributing to the required structural change of the employment system. It is also necessary to investigate which structural changes in the institutional arrangement and its functions could promote or inhibit the orientation towards the model of socio-ecological transformation.

5.2 Research fields on the governance and sustainability of work

Changes in societal work assessment standards

Societal understanding of work is marked by institutional (e.g. distribution, protection, order effects) and cultural aspects (e.g. recognition, performance, solidarity or justice norms).

- What role does the ecological dimension play in societal and individual understanding of work, and how can different expressions be explained?
- What standards and criteria are relevant with regard to appraisal of the value of work/the sale value of labour, and which changes are apparent in this regard? What can be derived from this in the scope of control options in the context of sustainable work?

Governance of the use of human work resources

In work-sharing societies, work also always means the use (and networking) of people's outer, inner and social nature. In accordance with the model of sustainable work, the resources of human work should be used carefully, ensuring full recreation (Docherty et al. 2009).

- What socio-ecological effects are related to current technical and social division of labour? Which new forms of distribution of work – and, with it, social order as well – emerge, and what are their configurations in a context of sustainable work?
- What interactions exist between the aforementioned resources, and how can conflicting goals in their use be overcome? Which governance mechanisms might be appropriate for avoiding unintended ancillary and side effects recognised with socio-ecological transformation?
- Which combination of different control and regulation mechanisms might be suitable for reducing the currently existing coupling of social systems with paid work and the use (and networking) of work resources?

New work design options

Institutional governance, regulation and coordination practices have their social effects – normally in the form of longer-term, continuous processes which, for their part, produce

path dependencies. With this, the socio-ecological transformation of the paid work system requires an institutional change process.

- How can legal-bureaucratic, market-based, reciprocal trust-based governance and regulatory mechanisms of the paid work system be combined in such a way that social demands valid with socio-ecological arrangement of work may become effective?
- Which forms of coordination and organisation which exist as alternatives to market-based work, should be developed further, and under what conditions, for the sake of sustainable work (e.g. cooperatives, employees' companies, exchange rings etc.)?
- What change potential in the direction of socio-ecological transformation of work can be noted from e.g. labour law, the taxation system or rather "discursive" regulatory instruments, such as audits, reportings, "Corporate Social Responsibility" or Stakeholder workshops?

(Re)politicisation and democratisation of work

Both the social demands recognised with a socio-ecological transformation of the paid work system and the employees' interests are increasingly demanding participatory forms of change (Mückenberger 2016). As part of it, it is also worth investigating what sort of role the basic power asymmetries between employers and employees in the paid work system, and relationships with consumers, play (Dörre et al. 2011).

- To what extent is a more democratic involvement of employees a prerequisite for the success of sustainability-oriented transformation processes? What role here is played by different forms of organisation of interests and participation in the world of work?
- In what way could new technical possibilities (Blockchain; digital exchange markets) be used for more equal working and exchange relationships?
- How can consumers and/or civil society be more strongly included in the formation of work?

Differentiation and justice

Fragmentation and inequalities are increasing both on international scale and within the national paid work system – these are often regarded as injustices. With this, from an employee perspective in particular, the implementation of a "Just Transition" (ILO 2015) as an important component in a socio-ecological transformation of work.

- To what extent does increasing inequality and differentiation in work and employment relationships, in gender relationships, and between generations and (world) regions contribute to a differentiation of interests in connection with sustainable work?
- Which social prerequisites and effects are to be recognised with strategies in the socio-ecological transformation of work? Do they lead to an increase or a decrease in inequalities (e.g. in terms of privilege or precarity)?
- How can this heterogeneity be included in governance concepts? Which (new) actors play which role in this regard?

D. Transdisciplinary research for sustainable work. Scientific-structural and methodical development needs

The objective of the WG “sustainable work” is to contribute to remedying the sustainability deficit in current discourses on the future of work as well as to overcome the marginalisation of work in the discussion about sustainability. The scientific researchs contribution toward socio-ecological transformation of the working society lies with the analysis of current transformations and, subsequently, the identification of possible paths of development. This postulation has methodological and methodical implications, which have already been discussed for a long time in connection with sustainability-oriented transformation research. With the widespread participatory and action-oriented demand recognised in sustainability research, transdisciplinary research and interdisciplinary research are usually considered the royal road of this type of research and as a reasonable methodology for the promotion of a socio-ecological transformation (Jahn 2008). Transdisciplinarity in the dual sense – both the disciplinary programme contents and the programme contents which exceed scientific limits and include interest groups – goes far beyond interdisciplinarity. More recently, the controversially discussed demand has been designated under the keyword ‘transformative science’ for a much more activist kind of research practice which wants to forster changes (Grunwald 2015; Schneidewind 2015).

1. Scientific-structure development needs

Transdisciplinarity, as a scientific organisation and research principle, is applied when it is a matter of solving extra-scientific or multidisciplinary problems (e.g. environment, energy, health) (Gibbons et al 1994; Hansson 1999). Above everything else, it is expected that, via scientific and extra-scientific collaboration, it is possible to overcome bottlenecks in individual disciplines, achieve cognitive progress and ensure socially robust knowledge. In addition, these extensively participatory processes of knowledge generation can also have emancipatory effects, namely, if the involved forms of knowledge (necessarily different) are considered to be of equal value during the co-creation of knowledge (Bialakowski et al. 2011). Provided that intercultural transdisciplinary dialogue is successful, not only will hegemonic forms of knowledge be called into question and powerful dominances (such as between experts and lay people) broken; knowledge production will be fundamentally politicised and fields of learning overall opened up to allow for a possible transformation of the system of knowledge (Vilsmaier et al. 2017).

In the context of the topic of sustainable work, the expanded understanding of science – as both a research objective and a research practice – must be considered for the setting of the agenda i.e. it’s not just about complying with scientific standards and quality criteria, it’s also about promoting sustainable work conditions along with freedom and creativity in research work (inter alia with longer-term employment contracts, a solid work-life balance and promotion of health, comprehensive gender equality in particular with career chances and junior researchers development).

However, transdisciplinary research, despite its approx. 30-year history in sustainability research beyond the sustainability community, is still not acknowledged as a widely ac-

cepted scientific approach. In practice, interdisciplinary and transdisciplinary science planning and organisation, and research, are very complex and challenging. Not least because it is also about the preservation and assignment of disciplinary power positions (Garforth/Kerr 2011).

Organisational precautions are a basic prerequisite for functioning interdisciplinarity and transdisciplinarity: the conditions for interdisciplinarity and transdisciplinarity can be planned up to a certain level; however, they are not recognisable as innovation successes. One essential condition is that the disciplinary units must engage each other “while maintaining their independence (i.e. without becoming reciprocal to service providers)” (Balsinger/Kötter 1997: 529), meaning that it is not simply a “management problem” (Hansson 1999: 341). Interdisciplinary and transdisciplinary projects can be successfully conducted only upon the appropriate adaptation of the organisational knowledge production structures (i.e. appropriate research funding, adaptation of career paths and publication culture). The essential starting point for interdisciplinary and transdisciplinary cooperation is always a definitive problem which should be worked out as collaboratively as possible from the beginning, and which can be better solved via cooperation than from a disciplinary perspective alone.

2. Methodical development requirements

Socio-material analyses

An analysis of an historical and current social-ecological transformation requires an investigation of the societal as well as the material dimensions of the transformation process, and their relations (Becker/Jahn 2006, Fischer-Kowalski/Weiß 1998). There remains a great demand for research, especially with regard to the work-mediated metabolism of nature and society. What material and energy resources flows are roughly connected with the conversion of specific work processes and products (e.g. e-cars)? Normally, an interdisciplinary cooperation is necessary for such complex analyses, in order to guarantee a solid generation of long-term data.

Indicators and measurement of sustainable work

Indicators (systems) are of scientific relevance, for determining possible social-structural changes, as well as political planning aids (Wroblewski et al. 2017). At the same time, they can also serve as a democratic political instrument for negotiating desirable social developments (Stiglitz et al. 2009). Indicators play an important role in discourse on sustainability in particular – measuring possible progress, stagnation or even setbacks. It is also ascertainable that there are hardly any uniform indicator systems; depending on which indicators are used, this also means that the assessment of the developments will be very different (Littig/Grießler 2005). Regarding the topic of sustainable work, reasonable indicators (systems) are still largely new territory, and any possible links to existing indexes (such as the UN Human Development Index or the “Good Work” Index of the German Trade Union Confederation) remain to be explored.

Scenarios

Building on socio-material analyses, scenarios can be an important instrument for the appraisal and evaluation of future paths of development. As far as this is concerned, ideally a distinction should be made between explorative and normative scenarios (cf. Grunwald and Kopfmüller 2012: 105): a) Explorative scenarios describe different possible futures, regardless of their desirability. This includes research into the creation of negative scenarios which illustrate the socio-ecological problematic consequences recognisable with persisting unsustainable structures in the modern working society. b) In contrast to this, normative scenarios describe desirable futures. In relation to sustainable work, this implies descriptions of socio-ecological transformation paths with the current working society which can lead to a sustainable society.

Research should investigate the consequences of the currently discussed visions of a Green Economy, a post-growth society, a solidary economy etc. in relation to the objective of sustainable work and, as part of it, also reflect possible problematic side effects. Additionally, the development of normatively-led transformation scenarios i.e. of socio-ecological scenarios and utopias of a sustainable “activity-society” (or even a ‘leisure-oriented’ society) which exceeds a (non-sustainable) work-oriented society (Schneidewind 2013; Grunwald 2015) can be helpful as a transdisciplinary process for the formation of transformative politics.

The outlined transdisciplinary research for sustainable work and the socio-ecological sustainable transformation of work societies calls for critical self-reflection of science, economics, politics and civil society. This final report of the WG “Sustainable Work“ of the DKN in Future Earth aims to push this much-needed dispute.

Literature

- Adam, Barbara (1998): *Timescape of Modernity. The Environment and Invisible Hazards*. London: Routledge.
- Barth, Thomas/ Jochum, Georg/ Littig, Beate (Hg) (2016a): *Nachhaltige Arbeit. Soziologische Beiträge zur Neubestimmung der gesellschaftlichen Naturverhältnisse*. International Labour Studies. Frankfurt a.M./New York: Campus.
- Barth, Thomas/ Jochum, Georg/ Littig, Beate (Hg) (2016b): Nachhaltige Arbeit und gesellschaftliche Naturverhältnisse: Theoretische Zugänge und Forschungsperspektiven. in: Barth, T./ Jochum, G./ Littig, B. (eds.), *Nachhaltige Arbeit*. Frankfurt a.M./New York: Campus, S. 311-352.
- Barth, Thomas/ Jochum, Georg/ Littig, Beate (2019): *Transformation of what? Or: The socio-ecological transformation of working society*. Vienna: Institute for Advanced Studies (IHS). Available at: <https://irihs.ihs.ac.at/id/eprint/4938/30/ihs-working-paper-2019-barth-jochum-littig-socio-ecological-transformation-working-society.pdf>
- Becke, Guido/ Warsewa, Günter (2018): Neue Chancen für nachhaltige Arbeitsgestaltung. Wie Arbeitnehmer(innen) Nachhaltigkeit im Betrieb vorantreiben können. in: *GAIA* 27/1, S. 122 –126.
- Becker, Egon/ Jahn, Thomas (eds.) (2006): *Soziale Ökologie. Grundzüge einer Wissenschaft von den gesellschaftlichen Naturverhältnissen*. Frankfurt a. M.: Campus.
- Beer, Ursula (1984): *Theorien geschlechtlicher Arbeitsteilung*. Frankfurt a. M./New York: Campus.
- Bialakoski, Alberto/ Costa, María/ Patrouilleau, Mercedes/ Martínez, Rocío y López, Ana. (2011): "La coproducción investigativa, metodocrítico y alternativo". Los trabajadores en la nueva época capitalista. Entre el ser y el saber. O. Battistini, A. Bialakoski, M. Busso y M. Costa (Hg). Argentina: Teseo.
- Biesecker, Adelheid (1999): Vorsorgendes Wirtschaften braucht Zeiten. Von einer ‚Ökonomie der Zeit‘ zu ‚Ökonomien in Zeiten. in: Hofmeister, S./ Spitzner, M. (eds.): *Zeitlandschaften. Perspektiven öko-sozialer Zeitpolitik*. Stuttgart/Leipzig: Hirzel, S. 107-129.
- Biesecker, Adelheid/ Hofmeister, Sabine (2006): *Die Neuerfindung des Ökonomischen. Ein (re)produktionstheoretischer Beitrag zur sozial-ökologischen Forschung*. München: oekom Verlag.
- Biesecker, Adelheid/ Hofmeister, Sabine (2010): Focus: (Re)Productivity. Sustainable relations both between society and nature and between the genders. in: *Ecological Economics*, 69/8 (15 June 2010), S. 1703-1711.
- BMBF (Bundesministerium für Bildung und Forschung) (2015): *Sozial-ökologische Forschung Förderkonzept für eine gesellschaftsbezogene Nachhaltigkeitsforschung 2015-2020*. Bonn: BMBF.

- BMBF (Bundesministerium für Bildung und Forschung) (2014): *Forschungsagenda Green Economy*. Available at: www.fona.de/mediathek/pdf/Green_Economy_Agenda_bf.pdf
- Brand, Karl-Werner (2017): *Die sozial-ökologische Transformation der Welt: Ein Handbuch*. Frankfurt a.M./New York: Campus.
- Brand, Ulrich/ Wissen, Markus (2018): *The Limits to Capitalist Nature: Theorizing and Overcoming the Imperial Mode of Living*. Lanham: Rowman & Littlefield International.
- Brandl, Sebastian/ Hildebrandt, Eckart (2002): *Zukunft der Arbeit und soziale Nachhaltigkeit. Zur Transformation der Arbeitsgesellschaft vor dem Hintergrund der Nachhaltigkeitsdebatte*. Opladen: Leske + Budrich.
- Cerda-Becker, Claudia/ Sittel, Johanna/ Schmalz, Stefan (2015): Die Grauzonen der Arbeit: Zum Verhältnis von Informalität und Formalität im globalen Kapitalismus. in: *Journal für Entwicklungspolitik* XXXI/4. S. 4-11.
- Dingeldey, Irene/ Holtrup, André/ Warsewa (eds.): *Wandel der Governance der Erwerbsarbeit*. Wiesbaden: VS-Verlag.
- Dingeldey, Irene/ Holtrup, André/ Warsewa, Günter (2015): Alte, neue oder keine Normalitäten? in: Dingeldey, I./ Holtrup, A./ Warsewa, G. (eds.): *Wandel der Governance der Erwerbsarbeit*. Wiesbaden, S. 339-356.
- Docherty, Peter/ Kira, Mari/ Shani, A.B. (2009): What the world needs now is sustainable work systems. in: Docherty, P./ Kira, M./ Shani, A.B (eds.): *Creating Sustainable Work Systems*. London/New York: Routledge, S. 1-21.
- Dörre, Klaus/ Hänel, Anja/ Holst Hajo/, Matuschek, Ingo (2011): Guter Betrieb, schlechte Gesellschaft? Arbeits- und Gesellschaftsbewusstsein im Prozess kapitalistischer Landnahme. in: Koppetsch, C. (ed.): *Nachrichten aus den Innenwelten des Kapitalismus. Zur Transformation moderner Subjektivität*. Wiesbaden: VS-Verlag, S. 21-50.
- European Group on Ethics in Science and New Technologies" (2018): *Future of Work, Future of Society*. Brüssel: European Commission. Available at: https://ec.europa.eu/info/sites/info/files/research_and_innovation/ege/ege_future-of-work_opinion_122018.pdf
- Federal Ministry of Labour and Social Affairs (2017): *White Book 're-imagining work'*. Berlin: Federal Ministry of Labour and Social Affairs. Available at: https://www.bmas.de/SharedDocs/Downloads/EN/PDF-Publikationen/a883-white-paper.pdf?__blob=publicationFile&v=3
- Fischer-Kowalski, Marina/ Weisz, Helga (1998): Gesellschaft als Verzahnung materieller und symbolischer Welten. in: Brand K-W. (ed.) *Soziologie und Natur*. Wiesbaden: VS-Verlag, S. 145-172.
- Garforth, Lisa/ Kerr, Anne (2011): *Interdisciplinarity and the social sciences: capital, institutions and autonomy*, in: *British Journal of Sociology*, 62/4: 657-676.
- Gibbons, Michael/ Limoges, Camille/ Nowotny, Helga/ Schwartzman, Simon/ Scott, Peter/ Trow, Martin (1994): *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*. London: Sage.

- Grunwald, Armin (2015): *Transformative Wissenschaft – eine neue Ordnung im Wissenschaftsbetrieb?* GAIA 24/1, S. 17-20.
- Grunwald, Armin/ Kopfmüller, Jürgen (2012): *Nachhaltigkeit*. Frankfurt a.M./New York: Campus.
- Hansson, Bengt (1999): *Interdisciplinarity: For what purpose?* in: Policy Sciences 32; S. 339-343.
- WCED (World Commission on Environment and Development) (1987): *Our Common Future*. Oxford: Oxford University Press.
- HBS (Hans-Böckler-Stiftung) (ed.) (2000): *Wege in eine nachhaltige Zukunft. Ergebnisse aus dem Verbundprojekt Arbeit und Ökologie*. Düsseldorf: Böckler
- HBS (Hans-Böckler-Stiftung) (ed.) (2001): *Pathways to a Sustainable Future. Results from the Work & Environment Interdisciplinary Project*, Düsseldorf: Böckler.
- ILO (2013): *Sustainable development, decent work and green jobs*. Genf: ILO. Available at: <https://ec.europa.eu/eurostat/documents/118025/118123/Fitoussi+Commission+report> (Abfrage am: 03.4.2019).
- ILO (2015): *Guidelines for a just transition towards environmentally sustainable economies and societies for all*. Available at: http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_
- Jahn, Thomas (2008): Transdisziplinarität in der Forschungspraxis. in: Bergmann, M./ Schramm, E. (eds.): *Transdisziplinäre Forschung. Integrative Forschungsprozesse verstehen und bewerten*. Frankfurt/New York: Campus Verlag, S. 21–37.
- Jochum, Georg/ Matuschek, Ingo (2019): Arbeit im Spannungsfeld von digitaler und sozialökologischer Transformation - Interferenzen, Synergien und Gegensätze. in: Becke, Guido (ed.): *Gute Arbeit und ökologische Innovationen - Perspektiven nachhaltiger Arbeit in Unternehmen und Wertschöpfungsketten*. München: Oekom-Verlag, S. 81-100.
- Koepf, Robert/ Schunke, Franziska/ Köhler, Christoph/ Liebig, Steffen/ Schröder, Stefan Working (2015): *Arbeit in der Postwachstumsgesellschaft. Diagnosen, Prognosen und Gegenentwürfe Eine kommentierte Literaturübersicht*. Working Paper 6/2015 der DFG-KollegforscherInnengruppe Postwachstumsgesellschaften. Available at: http://www.kolleg-postwachstum.de/sozwgmedia/dokumente/WorkingPaper/wp6_2015.pdf
- Comossion on the work oft the future (2018): *Let's transform work!* (eds. Kerstin Jürgens, Reiner Hoffmann, Christina Schildmann). Düsseldorf. Hans-Böckler-Stiftung.
- Lange, Philipp (2017): *Sustainability Governance. Exploring the Potential of Governance Modes to Promote Sustainable Development*. Baden-Baden: Nomos.
- Lange, Steffen/ Santarius, Tilman (2018): *Smarte grüne Welt? Digitalisierung zwischen Überwachung, Konsum und Nachhaltigkeit*. München: oekom Verlag.
- Lessenich, Stephan (2016): *Neben uns die Sintflut: Die Externalisierungsgesellschaft und ihr Preis*. Berlin: Hanser.

- Littig, Beate. (2017): *Lebensführung revisited. Zur Aktualisierung eines Konzepts im Kontext der sozial-ökologischen Transformationsforschung*, Rosa-Luxemburg-Stiftung (ed.), Berlin. Available at: www.rosalux.de/publikation/id/14559/
- Littig, Beate (2018): Good work? Sustainable work and sustainable development: a critical gender perspective from Global North. in: *Globalizations*, 15/4, S. 565-579.
- Littig, Beate/ Griebler, Erich (2005): Social sustainability: a catchword between political pragmatism and social theory. in: *International Journal for Sustainable Development* 8, 1/2, S. 65-79. Available at: <http://nbn-resolving.de/urn:nbn:de:0168-ssoar-5491> (Abfrage am: 03.12.2018).
- Matuschek, Ingo (2016): *Industrie 4.0, Arbeit 4.0, Gesellschaft 4.0? Eine Literaturstudie, RLS-Studien 02/2016*. Available at: www.rosalux.de/publikation/id/8754/industrie-40-arbeit-40-gesellschaft-40/
- Mückenberger, Ulrich (2016): Citizenship at work. A guiding principle for social and trade union policy. *Transfer* 22/1, S. 25-44.
- Netzwerk Vorsorgendes Wirtschaften (ed.) (2013): *Wege Vorsorgenden Wirtschaftens*. Marburg: Metropolis.
- Nussbaum, Martha (2011): *Creating Capabilities. The Human Development Approach*. Cambridge/Mass., London: Harvard University Press.
- Pilgrim, Hanna/ Groneweg, Merle/ Reckordt, Michael (2017): *Ressourcenfluch 4.0. Die sozialen und ökologischen Auswirkungen von Industrie 4.0 auf den Rohstoffsektor*. Berlin: Power Shift.
- Pongratz, Hans J. / Voß, G. Günter (2003): From employee to 'entployee'. Towards a 'self-entrepreneurial' work force? *Concepts and Transformation*, Volume 8, Nr 3, 2003, pp. 239-254.
- Quijano, Aníbal (2000b): Coloniality of power, eurocentrism, and Latin America. in: *Nepantla: views from south*. Vol. 1, Nr. 3, S. 533-580.
- Reißig, Rolf (2012): Die neue »Große Transformation« – eine Erklärung und Deutung. in: Brie, M./ Candeias M. (eds.): *Transformationen im Kapitalismus und darüber hinaus, Papers, Rosa-Luxemburg-Stiftung* (ed.), Berlin, S. 11–24. Available at: www.rosalux.de/fileadmin/rls_uploads/pdfs/rls_papers/Papers_Transformationkonferenz_1.pdf
- Rätzl, Nora/Stevis, Dimitries/Uzzel, David (eds.): Labour in the Web of Life (Special Issue of *Globalizations*, Taylor and Francis), 15 (4)
- Rodenstein, Marianne/ Bock, Stefanie/ Heeg, Susanne (1996): Reproduktionsarbeitskrise und Stadtstruktur. Zur Entwicklung von Agglomerationsräumen aus feministischer Sicht. in: Akademie für Raumforschung und Landesplanung (ARL) (ed.): *Agglomerationsräume in Deutschland. Ansichten, Einsichten, Aussichten*. Hannover: ARL, S. 26-50.
- Scheer, Dirk (2006): *Governance und Nachhaltigkeit. Sondierung und Analyse beispielhafter sozial-ökologischer Steuerungsmuster*. Schriftenreihe des IÖW 183/06.
- Schneidewind, Uwe (2015): Transformative Wissenschaft – Motor für gute Wissenschaft und lebendige Demokratie, in: *GAIA* 24/2, S. 88–91.

- Schneidewind, Uwe (2013): *Transformative Wissenschaft: Klimawandel im deutschen Wissenschafts und Hochschulsystem*. Metropolis.
- Sen, Amartya (1993): Capability and Well-Being, in: Amartya S./ Nussbaum, M. (eds.): *The Quality of Life*, Oxford: Clarendon Press, S. 30–53.
- Sousa Santos, Boaventura de (2016): Epistemologies of the South and the future. in: *From the European South*, S. 17-29. Available at: <http://europeansouth.postcolonialitalia.it/journal/2016-1/3.2016-1.Santos.pdf>
- Stiglitz, Joseph/ Sen, Amartya/ Fittousi, Jean-Paul (2009): *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Eurostat.
- Sühlmann-Faul, Felix/ Rammler, Stephan (2018): *Der blinde Fleck der Digitalisierung. Wie sich Nachhaltigkeit und digitale Transformation in Einklang bringen lassen*. München: oekom Verlag.
- UN (United Nations) (2015): *Transforming Our World. The 2030 Agenda for Sustainable Development*. New York: United Nations.
- UNDP (ed.) (2015): *Human Development Report 2015. Work for Human Development*. New York: United Nations Development Programme.
- Urban, Hans-Jürgen (2018): Ökologie der Arbeit. Ein offenes Feld gewerkschaftlicher Politik? in: Schröder, L./ Urban, H.-J. (eds.) (2018): *Gute Arbeit, Ausgabe 2018: Ökologie der Arbeit – Impulse für einen nachhaltigen Umbau*. Köln: Bund-Verlag, S. 329-349.
- Vilsmaier, Ulli/ Vera Brandner/ Moritz Engbers (2017): Research In-between: The Constitutive Role of Cultural Differences in Transdisciplinarity, in: *Transdisciplinary Journal of Engineering & Science*, Vol. 8, pp. 169-179, 2017. doi: 10.22545/2017/00093.
- Wallerstein, Immanuel (1974): *The Modern World System. Capitalist Agriculture and the Origins of the European World Economy in the Sixteenth Century*. New York.
- WBGU (2011): *World in Transition – A Social Contract for Sustainability*. Berlin: Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen/ German Advisory Council on Global Change. Available at: https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2011/pdf/wbgu_jg2011_en.pdf
- WBGU (2019): *Towards our Common Digital Future (Flagship Report -Summary)*. Berlin: Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen/ German Advisory Council on Global Change. Available at: https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/WBGU_HGD2019_S.pdf
- Wroblewski, Angela/ Kelle, Udo/ Reith, Florian (2017): Einleitung: Gleichstellung messbar machen. in: Wroblewski, A./ Kelle, U./ Reith, F. (Hg): *Gleichstellung messbar machen. Grundlagen und Anwendungen von Gender- und Gleichstellungsindikatoren*. Wiesbaden: Springer, S. 1-12.