

ASSESSMENT REPORT ON SUBTHEME
"CULTURE, CONSUMPTION AND LIFESTYLES IN
RELATION TO SUSTAINABLE DEVELOPMENT"

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ABSTRACT

Many people believe that 'sustainable solutions' to global air pollution and climate change should include significant changes in human consumption and lifestyles. Under this heading six different NRP projects have been conducted. This chapter gives a review and assessment of these projects, supplemented with discussions of related research. The paper starts with a general statement of the environmental

problem of household metabolism as a key component of the socio-economic production- consumption cycle. It summarises and comments upon nine different (sub)projects. And it ends with general observations, conclusions and suggestions for research and policy in relation to sustainable consumption patterns. Conceptual problems, multidisciplinary perspectives and international implications are given special consideration.

1. INTRODUCTION

Household consumption is at the beginning and at the end of industrial production. Human needs and desires, habits and decisions, norms and rights in modern society materialise in an enormous 'household metabolism'. This involves the transformation, sooner or later, of many different kinds of energy, materials and products into various kinds of positive fulfilment, of course, but also in environment-polluting kinds of gaseous, liquid or solid waste. Through the direct and indirect use of fossil-fuel energy for household activities, including transport, and through the exhaust gases from landfills and waste incinerators, households contribute significantly to global air pollution and the risks of climate change.

In this paper, brief reviews and commentaries are given of six different projects on 'culture, consumption and lifestyles', as conducted during Phase 1 (1990-1994) of the Dutch National Research Programme on Global Air Pollution and Climate Change (NRP). These will be supplemented with a few related but otherwise funded studies on household consumption vis-à-vis environmental resource use. Table 1.1 offers an overview of project codes, titles and principal investigators. For more extensive project descriptions and for full references to complete project reports, the reader is referred to the relevant project summaries elsewhere in this volume.

Table 1. 1
List of projects in the NRP subtheme "Culture, Consumption and Lifestyles"

Title	Project leader	Number
Conditions for a moral code of moderation	J. Goudsblom	851038
Reduction of CO ₂ emissions by lifestyle changes	W. Biesiot/ H.C. Moll	852086
Analysis of the social significance of long-term low-energy/low CO ₂ scenarios for The Netherlands	W. Biesiot/ H.C. Moll	852085
Toward a sustainable lifestyles	P. Ester/ C.J.M. Midden	853119
Cognitive vs emotion oriented information on sound Environmental behaviour	C.J.M. Midden	852093

 Non-NRP-projects

Social welfare and environmental quality	M.A. Mentzel
Sustainable household metabolism	A.J.M. Schoot Uiterkamp

This section will be concluded by a general discussion of household consumption in view of sustainable development, followed by conclusions and suggestions for research and policy regarding household consumption and consumer lifestyles.

2. THE ENVIRONMENTAL BURDEN OF HOUSEHOLD CONSUMPTION

The throughput of energy, materials and products in households of varying size and style has grown impressively during the last fifty years. Some pertinent figures for The Netherlands are as follows. During the period of 1950-1990 the Dutch population has increased from 10 to 15 million inhabitants. In the same period, the percentage of Dutch land area (a total of about 34.000 square kilometres) used for buildings, roads and recreational facilities, increased from 8.4 to 16.1. Around 1950 there existed about 2 million household dwellings; this number had risen to 6 million in 1992. The average annual income, corrected for inflation, of heads of households in 1990 was twice as high as in 1950. Between 1965 and 1992 water consumption in Dutch households has increased from 100 to 135 liters per person per day; today about twice as much water is being used for bathing and showering and for textile washing than 30 years ago. The ownership and use of motor vehicles - especially passenger cars, but also vans and lorries - has grown very strongly since the 1950s. In 1960 some 670,000 four-wheeled motor vehicles populated the Dutch roads and streets. In 1980 there were about 4 million and in 1990 about 6 million motor vehicles (Vlek et al., 1993). The Dutch fleet of motor vehicles is expected to approximate the figure of 10 million in 2010, an average of about 300 motor vehicles per square kilometre of land area. The number of airplane starts and landings at Schiphol Amsterdam Airport rose from about 90,000 in 1960 to some 235,000 in 1990. The Schiphol authorities expect (and stimulate) that between 1990 and 2010 the number of 'passenger movements' will triple from 16 to 50 million annually.

From an international perspective it may suffice to quote Corson (1994) who - in a recent special issue of *Futures* - outlined various strategies for a sustainable future. The author starts his paper by describing current 'unsustainable trends': "Between 1950 and 1990, the world's human population more than doubled (from 2.6 billion to 5.3 billion), domestic livestock population grew 1.8-fold (from 2.3 billion to 4.1 billion), grain consumption rose 2.6-fold, water use nearly tripled, fish consumption grew 4.4-fold, and energy use quintupled. Over the same period, global consumption of wood and copper roughly doubled; steel production quadrupled;

economic output nearly quintupled; industrial production grew sevenfold; aluminium output and the use of chemical fertilizers increased roughly 10-fold; world production of organic chemicals, major sources of air and water pollution, rose 20-fold; and global air travel, which causes significant atmospheric pollution, soared nearly 70-fold. On average, resource use per person nearly tripled between 1950 and 1990. This growth, coupled with a doubling of human population, resulted in roughly a sixfold increase in human impact on the global environment during the four decades. Human activity is now altering the Earth's basic life-support systems and cycles, including the atmospheric system and the carbon, nitrogen, sulphur, biologic and hydrologic cycles" (Corson 1994, p. 206-207).

Taking this together, we may conclude that the households sector since 1950 has developed as an environment-burdening consumer of energy, water and materials, of meat, fish and agricultural produce, and of motorised transport and land area, and it has become a major producer of diverse kinds of waste. Household metabolism, therefore, is an important focus for scientific research and for government policies aimed at reducing global air pollution and the risks of climate change.

3. THE PRODUCTION-CONSUMPTION CYCLE

To understand household metabolism, its driving forces and its potential for change toward sustainable consumption patterns, it is necessary to appreciate the interwovenness of household consumption and industrial production. Figure 3.1 represents what may be called the production-consumption cycle, as institutionalised in a social, i.e., government-regulated market economy.

The figure reflects the simple truth that consumers and producers need each other for different reasons, and that both parties need some government regulation for which the government in turn needs them, again for different reasons. The relationships among consumers, producers and government are expressed in flows of money, products, labour, taxes and subsidies. Main system functions for consumers are feeding, clothing, housing, education and recreation. Major functions for producers are energy provision, industrial production, agriculture and stock-breeding, product distribution and commerce. Inputs from outside the socio-economic system are formed by various environmental resources such as energy, raw materials and land area. External outputs or derivatives occur in the form of various kinds of waste materials as well as transport.

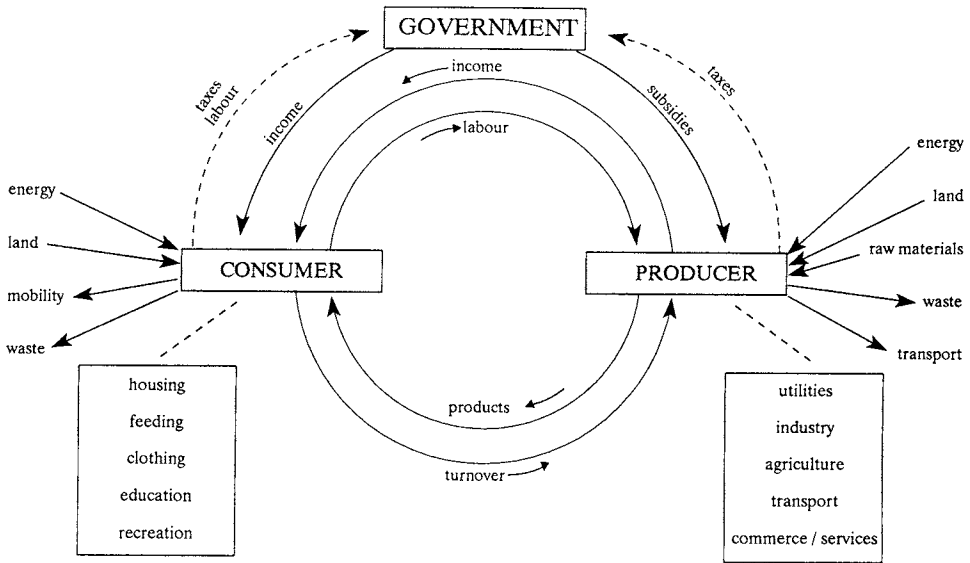


Figure 3.1
Social market economy

4. POPULATION, AFFLUENCE AND TECHNOLOGY

An other way of positioning household consumption is to follow Ehrlich and Holdren's (Ehrlich et al., 1971) formula for estimating the total environmental impact from human activities: $I = P \times A \times T$, or: environmental impact (I) equals the product of population size (P), the degree of affluence (A) per person, and the environmental damage from the technology used (T) to produce one unit of affluence. The formula implies that there are three different fronts on which the battle for sustainable development is to be fought. The formula also reveals the substitutability of one component by the other. To illustrate, total environmental impact might remain constant under considerable population growth, as long as average personal affluence and/or the technological impact per unit of affluence is/are proportionally reduced. Also, while total environmental impact stays constant, the degree of affluence per person may well increase significantly, provided that the number of people and/or technological impact per unit affluence is/are proportionally reduced. The 'IPAT-formula' enables one to explain and predict and to eventually manage the size and seriousness of environmental impact, for different geographic regions or countries of the world, to determine the most important impact growth factor(s) and to draw conclusions on optimal environmental management policies.

Recently, Goodland, Daly and Kellenberg (1994) have systematically examined the potential for change in the three areas covered by the IPAT-formula: (1) limiting population growth, (2) limiting affluence and consumption growth, and (3) reducing the environmental impact of production and consumption technology. Like Corson (1994), these authors generally conclude on a number of policy priorities, which are different in character for high-income and low-income nations of the world. For example, high-income nations are advised to work on "transforming the culture of consumerism (...) into an ethics of sufficiency and environmental sustainability", and on "internalizing environmental costs in energy prices and accelerating the transition to renewable energy sources" (Goodman et al., 1994, p. 153). In contrast, the authors advise low-income nations to give priority to: "accelerating the transition towards population stability (...), supporting technologies which provide increased employment opportunities for unemployed and underemployed individuals (...), and improving efforts towards poverty alleviation .." (Goodman et al., 1994, p. 154). One general conclusion by Goodland et al. is: "Technological change and population stabilization cannot suffice to move the world towards an environmentally sustainable future. Instead, a reduction in per capita consumption in high-income nations and a decrease in environmental throughput are required" (Goodman et al., 1994, p. 154). Whether and how this could be accomplished is a major question underlying this review of recent Dutch research on household metabolism. Let us now look at the separate projects.

5. ECONOMISATION AND ECOLOGISATION

Three interrelated NRP-funded projects on consumption and lifestyles (NRP project no. 851038) have been carried out at the University of Amsterdam. Together with sociologist-psychologist Goudsblom, researchers Schmidt, Spier and Aarts have looked into the possibilities for developing a 'morality of increasing moderation' among household consumers. All three projects started from the premise that environmental degradation, including global air pollution and climate change, is a problem of human civilisation (see also Thoenes, 1990 and Vermeersch, 1990), which strongly resides in ecologically unbridled economic growth.

Reviewing available literature, Schmidt (NRP project no. 851038-1) - interacting with Goudsblom - critically analyses and describes the historical process of 'economisation' in western society. In his view, this has come to replace more traditional, often military ways to acquire, maintain and expand the wealth of nations. Through strong inherent growth tendencies economisation has also led to a decline of 'ecological regimes' for production and consumption. With this less violent, thus 'more civilised' economisation also came the translation of 'everything worthwhile' into equivalent monetary values. By implication, non-valuable goods and services tended to be seen as 'worthless'. Effective economisation required greater military self-control from powerful individuals, and it gave greater technical control over nature. Economisation also led to a significant increase in the division of labour, and to the development of industrialised cities. Thus, many people came to live at a distance from the natural environment and they lost sight of their natural living conditions. And gradually, with increasing affluence came a relaxation of traditional norms of frugality and thrift.

The solution to 'economisation', according to Schmidt, lies in a gradual 'ecologisation' of society. This would amount to developing a strong environmental awareness and attempting to keep human activities and human populations within the limits of the earth's carrying capacity. Such a 'next step in human civilisation' would require new forms of self-control and it would demand new kinds of intelligent control over the environmental effects of human action.

Comments on Schmidt's project

Agriculturation, militarisation, economisation and ecologisation might well be distinguishable periods in human civilisation. It seems important to note that these developmental stages occur(red) in correlation with a growing and spreading human population and with an ever more intensive exploitation of the earth's surface. Was economisation actually driven by war-weariness, or were military efforts only too supportive of economic expansion? Or was it population growth and increasing agricultural uncertainties that have led to economic industrialisation? Other socio-cultural analysts of environmental degradation point at the role of Christianity (White, 1967) in which man is positioned above, not among other living beings. Or they indicate the fundamental roles of science, technology and capital (Vermeersch, 1990) in creating a technologically violent 'here and now' consumer culture. In the latter, privacy, power and freedom are key values for the individual (Thoenes, 1990). Environmental economists (Opschoor, 1989), point at the conflict between short-term individual and long-term collective interests, which is inherent in a free-market economy; through the accumulation of the external costs of numerous individual activities, society as a whole is burdened with collective costs and risks for which individual actors tend to feel little responsibility. Schmidt's analysis is important in so far as it draws our attention to the drawbacks and the possible excesses of economisation as a civilisation stage. As a socio-cultural analysis of 'the environmental question', however, it needs to be supplemented by views from other social-science disciplines.

6. RISE OF THE ENVIRONMENTAL PROTECTION MOVEMENT

What societal powers exist that are or could be pushing the needed 'ecologisation' deemed necessary by Schmidt? Spier (NRP project no. 851038-2), supported by Goudsblom, has explored the rise and the effectiveness of the environmental protection movement (EPM) in The Netherlands. Started in the early twentieth century as an elite form of appreciation and care for nature, the Dutch EPM now consists of various professional organisations of monitors, publicists, advisors and activists, working towards the protection of natural areas and warning against careless industrial pollution, the unlimited growth of motorised traffic and the inconsiderate use of open space for siting industries, house-building and/or road construction. EPM organisations, however, differ in effectiveness. Spier makes a distinction between the more traditional societies for the protection of birds and for the maintenance of natural monuments on the one hand, and the newer, more critically operating organisations for general environmental protection on the other. He notes that the, more successful, traditional organisations have always attempted to realise their relatively modest ambitions in a positive and prudent way, taking care to appeal to the general public and to be acceptable for policy makers. The more general EPM organisations, however, are pursuing their more

ambitious programmes for social behaviour change and societal restructuring in a less discreet and more activist manner, while emphasising negative developments in environmental conditions. This may explain why many people don't like them and refuse to heed their advice.

Spier concludes that "sounding the alarm is a necessary component of efforts to stimulate ecological awareness, (but) positively phrased campaigns to stimulate specific forms of moderation will in my view prove to be more successful than alarmist approaches, and should clearly be kept separated. In addition, the ability to exercise influence at the highest level of decision making (...) may be very helpful to spread forms of ecological moderation".

Comments on Spier's project

For environmental policy to be effective, there should be sufficient social understanding of the problem and acceptance of policy measures. This is often dependent upon the activities of pioneering organisations. Spier's project demonstrates that their public following and their political influence significantly depend - of course - on the relative attractiveness or painfulness of their message, but also upon the style and the way in which this message is being distributed. For environmental protection organisations, being stereotyped as a noisy minority preaching unachievable ideals, would be lethal. Alternatively, the stigma of the well-to-do land owner who wants to preserve natural peace and quiet for himself and his friends, would be similarly killing. The EPM would be well advised to think hard about the fundamental conditions that should be fulfilled for their messages to get through and to be transformed into actual policy measures and social behaviour changes. Using principles of commercial product marketing, taking account of basic social-behavioural mechanisms, and continually working on image-building might prove to be effective. The government, as the guardian of public environmental qualities, could assist here: by supporting diagnostic environmental research, by sharing the use of its distribution channels, and by being clear and consistent in its environmental policy goals. Currently, both the traditional and the 'modern' EPM organisations are dissatisfied with Dutch policy making - and more so with policy implementation - concerning environmental qualities and conditions. They agree with one another that long-term environmental protection also is an economic necessity and that various short-term economic priorities reflect the short-sightedness of government departments and industrial organisations.

7. STATUS SEEKING THROUGH MODERATION

Obviously, the basic attitude and 'lifestyle' of the environmental protection movement is considerate for the environment, moderate in consumption, reserved towards industrial expansion and restrained in the use of motor vehicles. If such moderation in household consumption would appear to be necessary on any large scale, in order to limit greenhouse gas emissions and diminish the risks of climate change, how could it be accomplished? In her study on consumption and social stratification, Aarts in collaboration with Goudsblom (NRP project no. 851038-3) lists four general approaches. Economic policy, legislation and enforcement, and environmental information feedback combined with moral appeals are three of

them. The fourth one involves encouraging spontaneous shifts in social behaviour through increasing the status and prestige derived from voluntary self-restraint in consumption.

Aarts's project is focused on the latter strategy. Via in-depth interviews and questionnaire surveys she has investigated if and how moderate and self-controlled lifestyles among higher-income, higher-status groups (who have a choice) may 'trickle down' into environmentally less aware and more consumptive segments of society. "Affluence is an important condition and point of departure for moderation," says Aarts, "as it liberates people from the struggle for subsistence and increases their opportunities to plan ahead." Moderation may enhance social prestige, because it reveals the 'distinctive' ability to restrain oneself, and it therefore may also be sought after by other population groups. Thus moderation and the 'new' social status it provides may trickle down into society as a whole and ultimately lead to the strong collective awareness of environmental processes and effects, which is needed to achieve an 'ecologisation' of society.

The study by Aarts reveals that among the higher-income groups, the better-educated are more sensitive to the environmental effects of consumption. They eat healthier food and less meat, buy more bottled instead of tetra-packed milk, save more fossil-fuel energy, and are more averse to producing waste, than the average lesser-educated and/or lower-income group member. However, better-educated higher-income group members show little restraint in cultural and holiday travelling (often by car or airplane), which they see as being socially prestigious par excellence and as therefore putting the prestige from self-restraint into its shadow.

Comments on Aarts's project

This research capitalises on the importance of social comparison processes, in which individuals continually try to identify themselves among others, in terms of income, talent, education, power, and status. A basic principle of social comparison theory (Suls et al., 1997 and Masters et al., 1987) is that people feel most comfortable when they are just a little better (off) - in various respects - than other people in their social environment. Thus, striving to reach a position of 'being slightly better (off)' is an almost daily activity for most everyone. And if 'being better (off)' is largely defined in terms of material consumption and possessions (Dittmar, 1992), then we have a powerful explanation for permanent consumption growth. Aart's thesis is that a re-definition of 'being better (off)' is necessary and seems feasible, whereby material consumption may be reduced for the improvement of environmental quality.

One rather tricky and perhaps depressing property of the social processes described by Aarts is that new 'distinctive' and 'prestigious' forms of (moderate) consumption among high-status groups arise only when the old, to-be-rejected consumption behaviours are experienced as 'too common' and therefore no longer status-giving. This and other considerations lead Aarts to conclude that other strategies such as economic measures, legislation and normative appeals should also be relied on, in order to bring about environmentally sustainable patterns of human consumption.

8. CO₂ EMISSIONS REDUCTION VIA LIFESTYLE CHANGES

Nicely complementary to the previously discussed projects by Schmidt, Aarts and Spier is the energy-technological study by Vringer, Wilting, Biesiot, Blok and Moll (NRP project no. 852086). This project team from the universities of Utrecht and Groningen has first developed and refined an input-output energy analysis (IOEA) methodology for determining the direct and indirect energy requirements of various household consumption patterns. In their first subproject, indirect energy use for consumption was determined by assessing the cumulative energy intensity, i.e., the total amount of energy needed for one financial unit of production, of 56 Dutch production sectors. This measure, of course, also includes the energy intensity of exported goods, but with the help of available export statistics it can be corrected for this. Also needed, then, are estimates of the cumulative energy intensity of imported goods, which constitute part of total domestic consumption.

The primary aim of Vringer et al.'s project is to analyse if and how CO₂ emissions can be reduced by changing lifestyles. Thus, in their second subproject, the authors attempted to identify and describe distinct 'lifestyles' in terms of systematically different patterns of household consumption in regard to their energy intensity and 'CO₂ content'. Lifestyles are identified by correlating income, time budget and consumption variables with total household energy requirement. The latter was assessed by determining the energy intensities of about 350 consumption categories and combining these using data from a recent national household expenditure survey. In a third subproject, the consequences of possible future technological developments on the energy intensities and the CO₂ content of lifestyles are being modelled via a scenario approach. Some substantive results from the first two subprojects are as follows.

Although the energy intensity per financial unit of production has significantly declined between 1969 and 1988 in most sectors of the Dutch economy, the embodied energy of total production has increased. This is because the growth of production has dominated the decline in energy intensity. Between 1969 and 1988 the embodied energy of Dutch exports has exceeded that of imports; The Netherlands now is a net exporter of embodied energy of materials and products. This partly explains the rise in total Dutch energy consumption in this period. While many energy conservation programmes are focused on reductions in direct energy consumption, several production sectors and the households have a higher indirect (embodied) than direct energy consumption. Therefore, reducing indirect energy consumption should get more attention in government energy policy.

As far as households are concerned, their total average energy demand in 1990 was 240 gigajoules, of which 46% consisted of direct energy consumption (for heating, lighting and car fueling) and 54% reflects indirect energy use (as embodied in materials, goods and services purchased). There appears to be a strong relationship between household expenditure and total energy demand, expenditure level being strongly correlated with net income. One additional factor is household size; one-person households use significantly less energy than households consisting of two or more persons. Large differences in energy intensity were observed among different consumption categories, as well as among households

having the same expenditure level. This is indicative of the fact that lifestyle changes may result in significant reductions in energy use and CO₂ emissions.

Comments on Vringer et al.'s project

The IOEA-methodology is an important development in energy analysis research. A tool like IOEA is indispensable if one wishes to assess the cumulative energy intensity of household consumption and to identify energy-relevant differences in lifestyle. For identifying and distinguishing lifestyles themselves, however, household-economic and demographic data, such as income and household size, may be greatly insufficient. Despite the fairly strong correlation between household income and total energy demand, there appear to be relatively energy-intensive low-income households as well as energy-thrifty high-income households. This is obviously due to different patterns of expenditure. Would these be explained by differences in 'lifestyle'? How could lifestyle be independently defined and assessed? And to what extent would the lifestyle of an household be determined by personal or family-cultural factors on the one hand, and by situational factors inherent in that household's physical and social environment on the other? At this point one would like to see research inputs from sociology, social psychology and cultural anthropology, where differences in lifestyle have been the subject of study for quite some time already.

The lifestyle subproject on energy and CO₂ emissions reduction is still under way (until mid-1995). By means of scenario construction possible changes in industrial practices and consumer behaviour will be modelled and evaluated with regard to their consequences and implications for fossil-fuel energy consumption.

9. LOW-ENERGY, LOW-CO₂ EMISSIONS SCENARIOS

Related research is being conducted at the University of Groningen in a multidisciplinary project by Kamminga, Slotegraaf, Van der Veen and others (NRP project no. 852085), on the social significance, feasibility and acceptability of low-energy, low-CO₂ emissions scenarios for The Netherlands. Here, recent macro-economic scenarios for the development of the Dutch economy in an international context formed the starting point (CPB, 1992). The investigators argued that prospective modelling by macro-economists insufficiently indicates the meaning and implications of the relevant scenarios for various social and economic groups in society, and that their acceptability as possible futures is empirically unclear. Also, the researchers wished to explicate the assumptions and presuppositions underlying the scenarios and to inspect the way in which predictive elements of the scenarios - such as, e.g., employment rates or energy price levels - had been handled.

As a beginning, the project team of sociologists, economists, psychologists and environmental scientists has critically evaluated the CPB scenarios. These had been published by their composers as an explorative means to shake up mental maps of policy makers and to provoke and guide public debates about the future of socio-economic life in The Netherlands. The CPB scenarios were designed on the basis of three different views on economic development, viz. the equilibrium perspective, the co-ordination perspective and the free market perspective. A next

step in their elaboration was a comparative-strength analysis of seven different economic regions of the world. Finally, analyses were made of seven long-term trends, such as population growth, environmental qualities, world food supply and international co-operation. Eventually three different scenarios for the Dutch economy in international context emerged: (1) 'Balanced Growth', an optimistic scenario, (2) 'Global Shift', a pessimistic scenario, and (3) 'European Renaissance', a crisis-overcoming scenario. All three scenarios involved policy measures and expected effects with regard to energy, housing, agriculture, industry, transport and health care. None of the scenarios, however, clearly stood out as a 'low-energy, low-CO₂ emissions scenario'.

Because of this, because no formal scenario construction methodology had been followed, and because various assumptions and predictions that had been made, could not easily be validated, the University of Groningen team decided to develop its own policy scenario for a low-energy, low-CO₂ emissions future for the Dutch social market-economy. After carefully studying available documents and interviewing relevant experts, the team has constructed an overall package of general energy-savings and emissions-reduction measures for The Netherlands as a whole, plus four subsets of sector-specific packages directed at industry, households, greenhouse horticulture and freight transport. The scenarios and subscenarios involve policy measures such as a general energy tax, energy-savings information campaigns, subsidies for energy-efficient technology, application of energy consumption standards and quota, subsidies for low-energy lighting equipment, promoting efficient transport management, discouraging air transport, and speed limitations for road traffic.

In three subsequent empirical studies, the macro- and meso-economic significance and effects, the evaluation and assessment by meso-level social and economic actors and decision makers, and the evaluation and acceptance by micro-level (i.e., household) representatives were investigated by an economist, a sociologist and a social psychologist, respectively. Some substantive results are the following.

Economically, the significance of a 'low-energy, low-CO₂ emissions scenario' hinges upon: (1) its distributional effects in terms of income, employment and economic growth, (2) its structural effects in terms of new opportunities at the supply side of the Dutch economy, and (3) institutional changes necessary to support the restructuring and redistribution involved in a sustainable economic development. Sociologically, it appeared possible to specify the socio-political plausibility of major policy measures reasonably well, via a modelling of key meso-level actors' preferences and power positions in the overall political decision-making process. For example, it turned out to be 'quite probable' that a gradually increasing energy tax for 'small' consumers will actually be introduced, while the probability of significant car-use reduction measures was assessed to be a moderate 50% on the short term. Social-psychologically, it became clear that some 1200 Dutch household representatives are fairly well informed about the global greenhouse effect and judge it desirable that something be done about it. Also, on the average they evaluated a number of household energy-savings measures as reasonably effective and sufficiently acceptable in view of expected changes in quality-of-life. Women, higher-educated persons and non-motorists appeared to find

mobility-directed energy-savings measures to be more acceptable than men, lower-educated persons and regular car-drivers.

Comments on Kamminga et al.'s project

"Macro-economists tend to see and contemplate things at a high level of aggregation. What certain future events and policy measures actually mean for the people and the organisations concerned, does insufficiently enter their functional range of vision, and so does the potential degree of social acceptability." This critical viewpoint has fruitfully stimulated the investigators to explore the essence, the meaning, the feasibility and the (differentiated) acceptability of socio-economic and energy-savings scenarios for The Netherlands. It is important to learn that this macro-economic scenario construction by the Central Planning Bureau and associated institutes (CPB, 1992) was not based on formal concepts and an explicit methodology. It was a drawback for the project team to note that a significant 'low-energy, low-CO₂ emissions scenario' was not available at the outset. But then it turned out to be highly instructive to go around energy documents and experts in an attempt to compose one's own package of feasible energy-savings measures. And it is worth-while to learn that 'social acceptability' has a different meaning for an economist (thinking about distributional effects), a sociologist (thinking about the preferences and political influence of meso-level actors) and a social psychologist (thinking about changes in quality-of-life and people's potential for adaptation).

The multidisciplinary co-operation which has been established, needed its time to develop. A period of two years may be too short for operationalising the original research plan, getting the team to function effectively and to conduct the field research necessary to test your hypotheses and underpin your conclusions. With a little more manoeuvring space this multidisciplinary project could have yielded even more useful and interesting results. For example, the separate evaluation of sector-specific packages of policy measures by meso- and by micro-level actors could have been extended from the households to all four sectors covered in the scenario design phase. Also, a further differentiation of socio-economic sectors could have been made, in order to obtain a more comprehensive picture of policy measures and their acceptability. The innovative thing about this project is its basic approach of exploring and describing lower-level social effects and responses related to energy-relevant conditions and policy measures, and of subsequently assessing their social acceptability in terms of economic, sociological and social-psychological considerations. Such an approach may constitute an important counterpart to macro-economic efforts at 'scanning the future'.

10. LIFESTYLES AND DOMESTIC ENERGY CONSUMPTION

A final consumption and lifestyles project is carried out at the universities of Tilburg and Eindhoven, by Breemhaar, Van Gool, Ester and Midden (NRP project no. 853119). Here, an exploration is made of the measurability of the concept of lifestyle which appears to be somewhat difficult to define. Also, an attempt is made to specify 'sustainable consumption patterns' with regard to household energy use. Breemhaar et al. seek to define 'lifestyle' in terms of means-end chains, i.e., hypothetical strings of a particular consumer product, its perceived attributes, the

consequences associated to the attributes and the basic (implicit) values that are ultimately served when a consumer experiences those consequences. For example, a sports bike (a means) may be perceived as light, sturdy and dependable (its attributes), so that one may reach a not-too-distant destination fast, without hassles and along a quiet route, while having some exercise (the consequences), all of which is valued for its goal-effectiveness, 'naturalness' and healthiness (the ends). Such cognitive means-end chains are assessed via in-depth interviews with consumers. A 'laddering technique' is used to lead respondents along the hypothetical links in a means-end chain. Such chains are likely to be different for different products. They may also be different for different domains of consumer behaviour, such as feeding, clothing and transportation. And means-end chains may be categorised into distinct groups which are characteristic of different groups of consumers.

The authors' primary research question reads: "Is it possible to group means-end chains concerning a particular behavioural domain with regard to energy consumption, and are the groups interpretable as lifestyles concerning energy consumption?" An answer to this question is being sought via consumer interviews on means-end chains regarding home-work commuting, home heating, living-room lighting and using a freezer, a washing machine and a washing-dryer. Through content analysis and cluster analysis, the investigators arrive at graphical representations of adjectives describing attributes, consequences and values associated to particular consumer behaviours. Their project summary elsewhere in this volume contains the example of home-work commuting, based on interviews with a small number of respondents. Here, it appears that 'motorists' could be clearly distinguished from 'cyclists', and that the general as well as the commuting-specific context variables were differentially clustered for these groups. Results for the other types of consumer behaviour are still being analysed.

As 'lifestyles' may be strongly context-dependent, the researchers are also probing into the relationship between observed clusters of (personal) means-end chains and (more collective) clusters of context variables for certain groups of respondents and for given domains of consumer behaviour. They state that "it is difficult to conclude whether or not the similarities in classification of respondents on the basis of their means-end chains and on the basis of context variables constitute a causal relationship." Another unresolved issue is the generality of clusters of consumption consequences and consumer values across different types of household consumption. For example, in what way and to what extent would the goal-effectiveness, 'naturalness' and healthiness of the bicycling commuter also show up in his or her means-end chains for living-room lighting, home heating and using electric household machinery?

Comments on Breehaaar et al.'s project

This research is methodologically explorative and it proves to be labour-intensive. Determining means-end chains for specific consumption behaviours requires a serious and relatively long interview with attentive respondents. Content-analysing recorded responses and cluster-analysing coded elements of means-end-chains demands sophisticated data analysis and careful interpretation of results. Someone's 'lifestyle' may emerge as a certain clustering of means-end chains across different types of a consumer's behaviour. A group of consumers

sharing a particular lifestyle may show up, when it appears that their generalised means-end chains are sufficiently similar, in contradistinction from other groups of consumers who cherish other 'lifestyles'. This seems much to expect, and researchers must have some luck to obtain the commonalities underlying the lifestyle concept. Too much differentiation of lifestyles with regard to types of consumer behaviour and/or with regard to subgroups of consumers, would weaken the use of any concept of lifestyle. Also, too much emphasis on cognitive elements such as perceived attributes, consequences and values, may detract from the policy relevance of the lifestyle concept ("de gustibus non est disputandum"). Finally, it must eventually become clear to what extent lifestyles are person- or household-specific, and to what degree they depend upon characteristics of a consumer's physical and social context.

The present project is still under way, until mid-1995. Since not all data have yet been analysed and a full report is not yet available, it is still unclear to what extent lifestyles provide an appropriate conceptualisation of domestic energy consumption. However, if they do, opportunities exist to alter energy-intensive lifestyles into more sustainable ones. The investigators are continuing their search for 'sustainable consumption' and are attempting to define this concept in terms of patterns of energy-extensive household behaviours. Eventually, such patterns will be presented to small consumer panels for their evaluation.

11. FEAR-AROUSAL AND ARGUMENTATION IN RISK COMMUNICATION

For environmental policy in general and for climate policy in particular it is crucial that the risks of global warming be presented such that respondents accept the need for remedial actions. Adequate diagnostic research on environmental change and climate processes is one condition for this. An other condition is effective communication of diagnostic results. To study the effects of problem information on energy-savings attitudes, Meijnders, Midden and Wilke at the universities of Eindhoven and Leiden (NRP project no. 852093) have performed a series of experimental studies. In the first experiment their goal was to observe the effects of fear-arousal and argument quality on people's attitudes toward purchasing 'a new type of energy-saving light bulbs'. Four experimental conditions were created by crossing a low- versus high-fear arousing problem-information variable with a weak versus strong purchase-argument variable. Low-fear information was given in a concise description of global warming; in the high-fear condition this information was supplemented with photographs illustrating potential warming effects. Weak versus strong argument quality was varied via selection of arguments previously rated for their 'convincingness'.

On the average, the four groups of 19 subjects each (inhabitants of Eindhoven) reflected no overall (main) effects of fear level and of argument strength on their attitudes towards purchasing the new light bulb. In the low-fear information condition, however, the average subject's attitude proved to be more favourable after strong arguments' presentation than after weak arguments. At the same time subjects, in a 'thought-listing' task, responded by giving more issue-relevant responses to the high-fear message than to the low-fear message. These partly

unexpected results are provisionally interpreted as a possible suppression, in the high-fear condition, of systematic information processing. The authors generally conclude that "fear may have a positive effect on (people's) motivation to elaborate relevant information, but at high levels of fear, this positive effect may be overruled by a negative effect on information processing capacity". This project is being continued and therefore results of further experimentation are still to become available.

Comments on Meijnders et al.'s project

In view of apparently serious problems of climate risk communication, one may wonder what conclusions and recommendations would emerge from the voluminous literature on fear arousal and information processing in the face of risk. So far in this project the impression is given that almost exclusive reference is made to the social-psychological literature, and not to the many chapters and articles on 'risk communication' that have appeared since the mid-1980s, in several books on technological risk management, and in journals like *Risk Analysis*, *Journal of Communication* and *Journal of Social Issues*. Against the background of much of that literature the question arises whether the sort of fear-arousal, the kind of argumentation and the type of 'action' used in this project's first experiment may hit the point hard enough. Methodologically, this study has been designed and conducted in a convincing manner, about which it is enjoyable to read. The theoretical basis of the project is interesting and important, but it could be broadened so as to incorporate sensitive elements from the multidisciplinary debate on technological-risk communication. For a policy-supporting research programme like NRP the question is whether theory-directed, high-quality experimentation will indeed yield the sort of useful results the programme committee is hoping for. Perhaps a more daring kind of field experimentation, based on a multidisciplinary effort to formulate problem information, select type of communication and design environment-protective actions, could provide the kind of conclusions and recommendations that would be both theoretically justified and practically useful.

12. SOCIAL WELFARE AN ENVIRONMENTAL QUALITY

"The currently dominant idea of material welfare is at odds with a lifestyle that does justice to basic human values. Measurement of welfare needs to attach importance to a good environment." This dual thesis forms the starting point of a non-NRP project which fits into the debate on sustainable consumption and lifestyles, conducted by Mentzel at the University of Leiden (see Table 1.1.). The author critically reviews the concept of social welfare as used by economic policy makers and he puts this in contrast with perceived well-being and quality-of-life as experienced by individuals. 'Economic' welfare is expressed in terms of ownership and consumption of material goods and of access to high-energy activities such as in transport. Aggregate economic welfare is quantified into a country's gross national income (GNI), and economic growth in terms of GNI is believed to be crucial. It is becoming clear that material economic growth is damaging basic environmental qualities and ultimately threatens the earth's life support systems. Therefore, particularly in the industrialised consumer societies of the northern hemisphere, a search for a 'sustainable lifestyle' is necessary. This, says Mentzel,

should cover the main spheres of life: at home, in the shopping-mall, in the workplace, in transport and traffic, and in recreational activities.

To delineate what is needed, a reconceptualisation of what we mean by 'the good life' is required, as well as empirical research yielding people's own conceptions and dimensions of welfare and quality-of-life. Various empirical studies on perceived well-being and quality-of-life have been performed which reveal basic dimensions of perceived welfare. For example, an important empirical dimension appears to be the capacity to control and consciously direct one's own living conditions. 'Having', 'loving' and 'being' are useful central labels for characterising essential conditions for human development and existence. Good health is highly valued in present-day society, while societal improvements are being sought in better interpersonal relationships and a higher quality of the natural environment. The author keenly puts his finger on the role of national and international institutions by which socio-economic developments towards sustainable consumption and production patterns are to be promoted and co-ordinated. Two questions are sensitive here: how to arrive at a just (re-)distribution of welfare, and how to increase the socially perceived, and thus (also) the political value of nature and its resources.

Comments on Mentzel's project

The problem of unsustainable economic growth and ecologically unbridled consumption (see also Schmidt's, Spier's en Aarts's projects above) necessitates a fundamental reconsideration of classical notions of welfare and quality-of-life. To conduct this debate in a fair manner, it seems useful to keep in mind that the currently dominant concept of economic (i.e., material) welfare is rooted in people's natural motivation to be safeguarded against poverty, discomforts and diseases. It is the 'overshoot' of an economic system originally designed to meet such essential human desires, which has put many (though by far not all) of us up with a consumer society where personal satisfaction, power and prestige have become strongly associated to material possessions and consumption. The critical goal of sustainable development, therefore, should be a set of economic (i.e. material) conditions which could be considered 'sufficient' and 'fair'. In a shortlist of recommendations for a sustainable lifestyle, Thoenes (1990) indicates the necessity of, among other: a guaranteed satisfaction of basic needs, the creation of a basic social equality for everyone, and expansion of possibilities for energy- and material-extensive behaviours.

Official present-day economic views of welfare are not as materialistic as Mentzel seems to suggest. The Organisation of Economic Co-operation and Development (OECD, 1982), for example, considers productivity, employment rate, purchasing power, balance of payments, government deficit and rate of inflation as basic economic indicators. The OECD recommends, however, that governments also pay attention to such dimensions as health, education, work conditions, social life, and the quality of public environmental goods such as air, water and natural areas. In a systematic review of social indicators research, Henderson (1994) searches for new indicators of wealth and progress and for changes in the meaning of 'development'. For example, for some time already the city of Jacksonville in Florida, U.S.A. evaluates its 'progress' in terms of nine categories of indicators, viz. 'the economy', public safety, health, education, natural environment, mobility (transport), government/politics, social environment and culture/recreation.

According to Henderson, a clarification of the confusion of *means* (e.g. material consumption, economic growth) with essential *ends* of human development is badly needed. It would seem that this could best take place in a public debate among policy makers, supported by relevant specialists from social philosophy, economics, sociology, psychology and cultural anthropology.

13. TOWARDS SUSTAINABLE HOUSEHOLD METABOLISM

A final project deserving attention is funded by N.W.O., the Netherlands Organisation for Scientific Research. In 'HOMES: HOusehold Metabolism Effectively Sustainable', Schoot Uiterkamp at the University of Groningen co-ordinates a multidisciplinary group of environmental scientists, economists, spatial scientists, social psychologists and administrative scientists. Since early 1994 these investigators first of all attempt to diagnose and explain developments and trends in household consumption between 1950 en 1990 and as far into the future as 2030. Because household consumption encompasses a multitude of goods, services and activities and therefore must be delineated, the project's focus is on housing and transportation, home heating and lighting, and durable household equipment, whereby a distinction is made between strategic (mostly: purchasing) decisions and the operational use of electricity, water and different fossil fuels for daily activities. Secondly, the project group is determining the environmental impacts of household consumption and assessing its (un)sustainability, both in terms of descriptive variables such as various kinds of resource use and waste materials and in terms of subjective judgements collected from household representatives. Thirdly, the HOMES team will systematically analyse and describe possible technical as well as behavioural options and strategies for changing household consumption such that it may be considered 'sustainable' in the long run. To this end, specific technical options and behaviours will be considered, and consumption patterns and lifestyles will be designed and evaluated in collaboration with consumer groups and individuals. Also, various different policy strategies for encouraging households to adopt sustainable consumption patterns will be described and evaluated for their potential effectiveness. By doing all this in a multidisciplinary fashion, the HOMES team aspires to cover and integrate the physico-chemical and the technical aspects and possibilities of household consumption as well as the social and behavioural components and opportunities for sustainability. The project as a whole is to be concluded in 1998.

Comments on Schoot Uiterkamp's project

'HOMES' is a problem-oriented, multidisciplinary endeavour to assess and understand household metabolism and to indicate ways and means for modifying this into a sustainable direction. Such an approach is explicitly stimulated by N.W.O. (see above) which - in its priority research programme on 'Sustainability and environmental quality' (1993-1998) funds altogether three such pluralistic projects (the other two deal with five major metal flows through the economy and with international river basin management, respectively). Considering the social and economic opportunities and motives for household consumption, looking into its relation to demographic developments and to physical infrastructure and government policies, and charting its various environmental effects, requires wide-ranging exploration and assessment as well strong co-ordination and overall

modelling. Furthermore, household metabolism and industrial metabolism are strongly interwoven (see Section 3 above). Hence both a diagnosis of current consumption and the design of sustainable metabolism would sooner or later have to cover both the households and various relevant production sectors of the economy. The latter perspective is already taken in Kamminga et al.'s NRP-project on 'low-energy, low-CO₂ emissions scenarios' (see Section 8 above), and it is also adopted in a newly started NRP phase II project on emissions reductions via lifestyle changes by Biesiot (Groningen), Blok (Utrecht) and others, which links up directly with the environmental-science subproject of HOMES. Whether the broad-ranging and ambitious HOMES-project will succeed is a matter of prudent delineation, effective co-operation, personal enthusiasm and some luck in designing and conducting data collection and overall modelling of results. A scientifically hazardous approach like this, however, seems badly required for understanding costly and harmful developments in society and for designing sustainable patterns of social and economic behaviour.

14. GENERAL CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS

14.1 'Economisation' and environmental exploitation

The NRP-research on consumption and lifestyles conducted so far has been a mixture of social-science, technological and environmental-science studies. These investigations have yielded important data and conclusions about societal motivations, developments and trends about consumption and lifestyles. By virtue of this, an interesting and useful picture of 'household metabolism' is emerging. During several decades now, strong increases in consumer purchasing power, in technological potentialities and in the market supply of a great variety of products, services and facilities, have met with social-cultural changes in individual and social motives of consumers. 'Economisation' has gradually led consumers, who are always partly driven by producers and advertisers, to adopt or aspire a prevailing lifestyle of high-quality material possessions and facilities, and of fast, short-term consumptive behaviours, whereby some basic goal or sense of life is easily obscured.

For a long time the economic system of western industrialised countries has been truly successful in combatting human poverty, ignorance, discomfort and diseases. In recent times, however, it seems to be overshooting its original goals and to be developing into an energy- and material-intensive monster which gradually eats up its own existential conditions and seriously diminishes various qualities-of-life. The 'modern consumer lifestyle' inherent to this system is increasingly expansive, mobile and environmentally harmful. Many technical options seem to be available for increasing energy- and materials-efficiency and for reducing the amount and variety of household waste. But the social implementation of these, as well as the possible occurrence of 'unsaving' substitution behaviours and further consumption growth, deduct from the environmental effectiveness of technology. Therefore, behaviour change and particularly 'moderation' are becoming the key words for policy makers who - on behalf of society as a whole - are trying to steer away from unsustainable household consumption.

14.2 Some policy recommendations

In their co-ordinated project summary Goudsblom, Aarts, Schmidt and Spier (NRP project no. 851038, see Sections 4-6 above) present a number of useful conclusions and policy recommendations. For example, as 'important obstacles to ecologisation' Goudsblom et al. mention: the strong social pressures to produce, inherent to industrial market regimes; the constantly rising productivity of labour as a result of competition; the fact that economic growth also is to create, or at least maintain, sufficient job opportunities; and the boosting effect on consumption of the status hierarchy in industrial market regimes. After listing various 'facilitating conditions for ecologisation', these authors also provide a number of policy recommendations, for example: to use and exploit the status motive in environmental policies, for instance, by associating social prestige to energy- and material-extensive behaviours; to stimulate further research into fossil-fuel energy savings techniques and their social implementation; to utilise the market mechanism through levies, taxes and subsidies for an 'ecologisation' of production, commerce and consumption; and to develop specific campaigns with regard to car-driving, holiday air travel, meat consumption and other energy-intensive social behaviours.

Goudsblom et al.'s conclusions and recommendations fit in with the fifth policy direction: 'institutional and cultural change', that emerged from a multidisciplinary and multi-party series of specialists' workshops conducted by Klabbers (Nijmegen) and Vellinga (Amsterdam); see (Klabbers et al., 1994). This strategic policy option came out of intense deliberations as one that might be inevitable to select if it would appear that 'no regrets', 'least regrets', 'acceleration' and 'technological innovation', the other four policy directions, are not effective enough to secure a sustainable development of society. Some focal policy actions under 'institutional and cultural change' would be: to initiate a debate on improving the quality of society; to intensify the care for residential environments; to encourage consumers to select higher-quality food products, to buy local products and to follow local cuisine; to promote active participation in cultural activities; and to use trendsetters as examples of behavioural change. Such a view also links up with recent ideas about a 'greening of the economy', about which a key author remarks that "we should be aiming to maximise the welfare obtained from economic activity while minimising the volume of matter and energy which flows through the economy" (Jacobs, 1991, p. 114).

14.3 Lifestyles and behaviour change strategies

In none of the NRP-studies conducted so far has the concept of lifestyle been given a theoretically convincing and methodologically sound definition. Therefore the notion of lifestyle is up for further improvement and operationalisation to support continuing research aimed at delineating sustainable lifestyles. It would seem that such research should be interdisciplinary in nature; consumption patterns might be defined as 'lifestyles' to the extent that they meet certain sociological, economic-psychological and ecological criteria. Candidate variables for these are family background, education, income, energy consumption, amounts of waste, degree of mobility, major life goals, habits and attitudes toward energy-savings, and appreciation of nature and natural living conditions.

In a thriving consumer society, changes in lifestyle or in prevailing social behaviours, in order to achieve energy savings and emission reductions, are hard to

explain and to bring about. It is an underestimated problem that such changes need to rest upon a sufficient awareness of environmental problems, that they cannot occur without the availability of feasible behaviour alternatives, that policy instruments for inducing behaviour changes may, if wrongly selected and tuned-in, be ineffective or even counter-productive, and that the subject of the desired behaviour changes to whom the policy instruments are applied, wants to have an idea of 'what the future will bring'. The social and behavioural sciences have much in store to clarify this problem and to support the design of effective policy instruments. A major kind of conceptual tools are models for analysing and explaining consumer behaviour. Attitude-intention-behaviour models (Ajzen, 1991), orientation-purchase-use-discard models (Van Raaij, 1994), and motivation-opportunity-ability models (Oelander et al., 1994) have proven to be suitable means for coming to grips with consumer behaviour and its potential for modification.

14.4 International research efforts

Household consumption, its stimulation by and its implications for various production sectors, and its gross environmental impact in terms of resource use, land exploitation and waste, is a topic of increasing international interest. For example, Oelander and colleagues in Denmark, with the support of the Danish government, are conducting a multidisciplinary project on 'understanding consumer behaviour as a prerequisite for environmental protection' (Oelander, 1994). At the International Institute for Applied Systems Analysis in Laxenburg, Austria, Nakicenovic and colleagues are conducting and forming a network around their 'Environmentally Compatible Energy Strategies Project' (Nakicenovic et al., 1994 and Grübler, 1991). So do Schipper and colleagues at Lawrence Livermore Laboratories in Berkeley, California (Schipper et al., 1989 and 1992). Also in the U.S.A., Stern [see Stern, 1994 for a review] has long investigated the psychological determinants of energy- and material-intensive behaviours and possible strategies for achieving environment-saving behaviour.

In The Netherlands, the Netherlands Energy Research Foundation in Petten has organised and published the results of several national workshops on 'lifestyle and energy consumption' (Perrels 1993 and 1994), where various motives, types of behaviour and strategies for behaviour change have been critically discussed. Again, it appeared that technical options are to be supplemented with behavioural options, and that the acceptability of any behaviour changes significantly depends upon their feasibility and their (perceived) environmental effectiveness. ECN-editor Perrels also recommends a multidisciplinary attempt at better defining the concept of lifestyle, and to carefully consider what different types of actors in society (e.g., consumers, producers, retailers, utility companies and government policy makers) actually do and could do to stimulate energy- and material-extensive behaviour patterns. Like the Dutch National Institute for Public Health and Environmental Protection RIVM (1991) in its National Environmental Survey 1990-2010, Perrels (1994, p. 73) also concludes that, in order to arrive at sustainable household metabolism, our cherished concept of economic growth may have to be differently filled-in (i.e., rather more qualitatively than quantitatively) and that international re-distribution of economic potential and wealth would be important for realising world-wide sustainability. Vivid stimulation of international comparative studies on consumption and lifestyles is

to be expected from the Human Dimensions of Global Environmental Change programme (HDP), initiated by the International Social Science Council in Paris. In HDP's Work Plan for 1994-1995 (HDP, 1994) household metabolism is not mentioned as such, but energy consumption, household resource use and individuals' attitudes and behaviours towards the environment are somehow incorporated in several 'major research areas', such as 'industrial transformation and energy use', 'demographic and social dimensions of resource use' and 'public attitudes, perceptions, behaviour and knowledge'. One problem with the HDP research programming so far, however, seems to be the predominance of general explorative questions as contrasted with specific research hypotheses about reasonably delineated (potential) policy issues. Another problem, it would seem, is the rudimentary development of an interdisciplinary perspective on global environmental change, whereby component research tasks might be usefully allocated in a multidisciplinary fashion.

14.5 Further NRP intentions

In the second phase on the NRP (1995-2001), the problem of energy- and material-intensive household consumption and the search for sustainable consumer lifestyles remain high on the programme's agenda. Study topics are, for instance: the relationship between (total) household metabolism, population development and trends in household formation and household activity patterns; the identification and explanation of 'unsustainable' lifestyles; and methods and instruments for designing and implementing 'sustainable' consumption patterns. Investigations concerning household consumption and lifestyles will be deliberately linked with studies on climate-problem awareness and with research on personal mobility and the diverse use of motor vehicles (see the review chapter on mobility and transport, elsewhere in this volume). Also, the NRP committee will promote international co-operation and exchange of ideas and research findings, as a way to improve international understanding and policy making regarding household metabolism.

14.6 Religions on consumption

To conclude this review chapter on culture, consumption and lifestyles in view of global environmental change, it may be appropriate to cite Durning (1992) who - after documenting, characterising and criticising western-industrial consumption styles much like Vermeersch (1990) does - provides a tabular overview of ideological statements on human consumption and wealth, as derived from nine major world religions. The Buddhists, for example, profess that "who in this world transcends his selfish desires, his worries drop from his shoulders as dew-drops from a lotus flower". The Hindi like to say: "He who is fully free of desires and without craving .. reaches peace". The Christians cherish their biblical quote: "It is easier for a camel to go through the eye of a needle than it is for a rich man to enter the kingdom of God", while the Muslims repeat after their prophet Mohammed: "Poverty is my pride". But perhaps the most applicable statement in view of the present review comes from the Confucianists: "Excess and want are equally bad". Would 'the middle way' be truly sustainable?

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