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Article — Digitized Version

Relaxing the limits to growth

Intereconomics

Suggested Citation: Dam, André (1978) : Relaxing the limits to growth, Intereconomics, ISSN 0020-5346, Verlag Weltarchiv, Hamburg, Vol. 13, Iss. 1/2, pp. 34-37, <https://doi.org/10.1007/BF02928837>

This Version is available at:

<https://hdl.handle.net/10419/139521>

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cipients show a fairly consistent pattern. Note that the group of countries with rather low exports saw a greater proportion of their balance-of-payments deficits covered by CFF drawings than the other two groups.

Final observations

□ STABEX, in its first year of operating, seems to have been mainly oriented towards the development needs of individual participating developing countries, witness the distribution of transfers among income groups of countries, the terms of transfers, and their financing. The CFF 1976 practice can be explained better in terms of striving for a balanced international trade by providing financing to primary exporters who experience a balance-of-payments deficit, in relation to their participation in international trade. Both arrangements can be said to have contributed towards their respective targets.

□ The schemes have been criticized on a number of grounds. E.g., STABEX total disbursement has been found limited indeed. Emphasis in STABEX on trade in primary commodities with the EC might discourage domestic processing and regional trade. Only the ACP countries benefit from STABEX. With respect to CFF, trade in services is not taken into account in the calculation of shortfalls. Even after the December 1975 liberalization of terms, shortfalls do not relate to real export earnings. Actual drawings remain a part of the shortfalls as calculated by the IMF now, as only that part of

the shortfall can be drawn which does not exceed a certain share of a country's IMF quota.

Such criticisms are valid. To meet them, the funds involved in the financing of STABEX and CFF would have to be increased substantially.

At present, STABEX transfers and CFF drawings compare with some selected capital flows as follows. CFF in 1976 is about one fourth of that year's medium-term Eurocredits to non-oil-exporting developing countries⁵), and more than one tenth of the net flow of private capital from DAC countries to developing countries and multilateral agencies in 1975⁶). STABEX 1976 transfers represent about 2% of the total recorded net flow of resources to Africa South of Sahara from DAC countries and multilateral agencies in 1975⁷).

□ For all their imperfections and limitations, the two schemes did work in 1976. The ACP countries benefiting from STABEX publicly stated their satisfaction with the scheme⁸). These facts are worth stressing. The 1976 practice seems to support the notion that stabilization of export earnings is an operational instrument at the disposal of the international community, and it justifies further efforts for a workable expansion of the schemes in the future.

⁵ IMF Survey, April 4, 1977.

⁶ OECD, Development Cooperation, DAC 1975 Review, Paris, November 1976.

⁷ *ibid.*

⁸ Communiqué of the Second Meeting of the ACP-EC Council of Ministers, April 13 and 14, 1977, Suva, Fiji.

WASTE MANAGEMENT

Relaxing the Limits to Growth

by André van Dam, Buenos Aires *

The following contribution is essentially based on the author's presentation to the Club of Rome's recently held world conference on "Alternatives to Growth". Dealing with the concept of waste management and its economic and social implications it is meant to stimulate the debate on the limits to growth into an altogether different avenue.

The common thread running through this paper is that the world can afford sustained economic growth to the extent that it manages waste in manufacturing, distribution and consumption. Waste management can reduce physical constraints which hamper economic expansion — in the human environment as well as in the supply of energy, and other critical or scarce resources.

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In addition, waste management can be instrumental in reducing ethical barriers to sustained economic expansion.

Waste management is envisioned as an agent to change the motivation and direction of economic growth — not necessarily its speed. Waste management is therefore not perceived as an alternative to growth. This is the quintessence of the thesis — which rests upon economic quantifications as well as upon moral considerations.

Waste management is no cure-all. It is a mentality that aims at trade-offs: between public needs and private wants — between investment and consumption — this generation and the next one — growth and equity — productivity and employment. It demands that private interests flow neatly into the stream of public interests; that, last but not least, the resources freed by waste management, be used for labor-intensive tasks.

There emerges no consensus as to the borderlines between consumption, residues and waste. It is exemplified in factors such as armaments, arson, burning coffee-beans on railroads, dripping faucets, featherbedding, food leftovers, idling many millions of acres of fertile cropland, obesity and a symbolic one-calorie softdrink, paper wedding-gowns, traffic jams, and coated throwaway toothbrushes — to name but a few. One man's meat is another man's poison: who is the judge of "waste"?

There are four types of waste which lend themselves best to rational management so as to relax the limits to growth. In a nutshell: conservation of energy; recovery of inorganic and organic resources; avoidance of premature obsolescence; last but not least, the usage of human talents and time. Sensible waste management in these areas offers the following 8 outstanding pluses which constitute a basis for the central thesis that waste management will allow for a sustainable rate of economic growth without inducing physical and ethical constraints:

Waste management tends to increase

- ☐ the lifetime yield of scarce or critical resources (recycling aluminium, copper, lead and steel; re-using water resources sequentially),
- ☐ the volume and meaning of employment (moving energy-intensive to labor-intensive tasks; fostering craftsmanship and a service economy),
- ☐ the quality of life itself (turning refuse into soil conditioners or parks; reducing ephemeralness in durable consumer goods; reducing mobility, for man to cast anchor again),
- ☐ the rate of sustainable economic expansion (using solar, tidal and wind energy rather than oil; establishing a policy of interchangeable spare-parts).

Waste management tends to diminish

- ☐ the pressure of inflation (reducing spoilage of agricultural produce, livestock; recycling resources, thus expanding the supply side),
- ☐ environmental hazards (reducing litter by imposing returnable bottles; using waste heatwater to safeguard streams, lakes),

☐ the cost of resources per unit of product (using thinner-walled and larger containers; a BTU saved is cheaper than a BTU generated; providing new end use after completion of lifetime),

☐ inequities in worldwide allocation of resources (waste management in North frees resources for South; service industry in North industrializes South).

It may well require a generation or two, before rational waste management leads to less energy-intensive, less nature-contaminating and less materials-wasteful ways of living. The crux of the matter is that it may introduce a labor-intensive economy which, I conjecture, can accommodate man's hunger for growth with his thirst for harmony with his natural environment.

Conservation of Energy

According to Ford Foundation's Energy Policy Project, at the end of this century the USA can save as much energy as it presently consumes — 88 quadrillion BTUs. The Worldwatch Institute reckons that the United States wastes more petroleum than the Third World consumes. From 1949–1974, Western Europe trebled its energy consumption, while Japan quintupled it. In the same time, the share of natural gas and petroleum in total energy demand rose from 15% to 65% in Western Europe, and in Japan from 10% to 75%. Clearly, energy conservation is the pivot of rational waste management.

Is energy conservation a matter of price? Price-demand elasticity remains to be tested. It is estimated that a *real* increase of 10% in the consumer price will decline demand by 2.5%. However, an indiscriminate price hike penalizes small and economically weak consumers. Waste management would call for a steeply progressive energy tariff, proportionate to the rate of usefulness and wastefulness of processes and products as well as to the deterioration they cause in the environment.

Energy conservation can be achieved too by the reduction of the distance between home and work; the thermic insulation of homes and buildings; the utilization of low-quality energy where high-quality (high temperature) energy is not required; waste reduction in private oil furnaces; in collective heating facilities; in energy plants themselves. Electric and nuclear plants discharge a trillion gallons of waste heatwater in the nearby streams and lakes, causing ecological hazards of great magnitude. Such heatwater must be utilized to provide nearby manufacturing industry with steam; residential homes and offices with hot

water; greenhouses and aquaculture with warm water.

Conservation of energy also calls for solar, tidal and wind energy; liquid and gaseous fuels from coal; geothermal energy and biomass — rather than nuclear power and petroleum. Solid waste (refuse) can be transformed into fertilizers and steam. America's solid waste could yield sufficient energy to yearly save half a billion barrels of petroleum, partly by recycling and partly by direct conversion.

The Waste of Wheels

The private motor car has lightened man's burden and has quickened his pace. It has brought supermarkets, tourism and new horizons. Its ripple effect in manufacturing industry is prodigious. It has indeed become the pivot of modern society. It also happens to constitute a leading source of waste. Half the petroleum fed into the internal combustion engine is lost in the transition to power and speed. Motoring weakens man's roots in time and space, disables and kills millions of people and contributes heavily to mental and nervous disorders.

The motor vehicle causes half the world's air pollution. For instance, over the past ten years the emission of lead by automobiles in the United States has risen fivefold. The rise was composed by a 40 % increment in the number of vehicles on the roads, an 80 % increase in emissions per vehicle-mile and a 100 % expansion in mileage per vehicle. This is largely to be attributed to a dearth of public transportation. Moreover wastefulness can be measured in mileage-per-gallon (mpg). For example, such optional equipment as automatic transmission and airconditioning can diminish mpg by 20 %. Some years ago the average limousine performed only 10 mpg. The US Government now demands an average 24 mpg by 1980, in order to reduce the burden of petroleum imports. The automotive industry reduces in consequence the average weight of the motor car by 850 lbs and the average length by a full foot.

Furthermore waste management demands to stretch the life of the motor car from the present average of 5 years to, say, 7 years. In addition, resource recovery upon completion of a car's lifetime should be mandatory. The motor vehicle absorbs 5 % of all plastics, 10 % of all aluminium and copper, 20 % of all steel and ferrous castings, 30 % of zinc and 70 % of lead. Finally, waste management would require optimum driving speed as well as the spread of carpools and public transportation.

The ultimate effect of such measures upon the economy is difficult to gauge. It depends largely upon the way in which the consumer will apply the resources freed by more judicious husbanding of the private motor car. It will entail a change in lifestyle, reduce the suburban sprawl, transform commuting patterns, alter urban planning, induce leisure activities, e.g. gardening, furniture-building, reading, and community recreation. Shifts from energy-intensive motoring to labor-intensive ways of life, amplify total employment, and enrich work and leisure.

Recovery of Resources

The United States produces 4 billion tons of solid waste per year. It consists of 65 % agricultural, livestock waste, 25 % minerals and mining waste, 10 % manufacturing, consumer, distribution and community waste. The environmental risks of waste disposal focus on recovery of household waste. The US Conference of Mayors anticipates that half the cities will no longer dispose of sanitary landfills by the end of the 1980s.

The rag-and-junk man illustrates that resources recovery is nothing new. He has been replaced by the 700 firms forming the US National Association of Secondary Materials — which collect, convert, manufacture, process, recover and/or refine waste products. Unfortunately capital gains tax exemptions, depletion allowances, preferential shipping rates and federal and other procurement specifications favor virgin materials over recycled ones. (One typical exception is that of the US Army which prefers retreaded tires over new ones.) Such a procedure obeys economic criteria, at the exclusion of ecological, ethical and geopolitical ones. A reversal of the existing trend is overdue because secondary production is less energy-intensive and nature-polluting than primary production. This concerns recycled organic materials, such as food, paper, plastics, rubber, textiles and wood as well as recycled inorganic materials, such as aluminium, iron, copper, lead, steel, and glass.

Recycling should become a multi-disciplinary endeavor as reflected in steel. The US Environmental Protection Agency indicates that every ton of recycled steel saves 100 kilos of air pollutants, 25,000 liters of fresh water, enough electric power for one average American home during 8 months. Glass is a recycling problem, due to the backward distribution channel and crushing technology. Yet, glassphalt is a good example of turning used glass profitably into solid road-paving material.

The most tragical waste is that of people's talents, and time. To be unemployed is to be deprived of

income, hope and self-respect. To be underemployed is to fritter away time and experience in tasks far below one's capacity. Featherbedding and absenteeism are waste which man inflicts upon himself and others. Society-at-large ultimately bears the cost of strike and work stoppage. Bureaucracy and queuing-up constitute the wasteful cost of large organizations. Indeed, waste of talent and time may prove the greatest obstacle to sustained growth.

Consequently, a reduction of waste not only spurs growth but it also enhances its quality. In considering manpower as capital, rather than cost, society-at-large improves not only the quality of work, but also that of life itself. Reduction of waste of talents and time should bring about a new feeling of self-realization; closer kinship between work and leisure, as well as an economy "as if people mattered". It would call for smaller work units, training and recycling of manpower.

Waste management of human resources requires a new look at the computation of the gross national product. Ironically in many countries the national accounts register such wastes as featherbedding, red tape and traffic jams but they rarely incorporate useful housework or leisure activities when they are not financially rewarded.

Now that, contrary to the past generation, finances and energy become expensive and scarce and labour abundant, it is time to design a service-intensive economy. It would aspire to full and meaningful employment — if necessary at the cost of mere productivity. Meaningful employment and leisure can diminish societal ills such as juvenile delinquency, divorce and alienation, drug addiction and suicide, and violence in general. A more equitable use of human talents and time adds up to more social growth and economic expansion.

Voluntary or Compulsory Waste Management?

A nationwide Yankelovich opinion survey, conducted soon after the oil embargo, inferred that "to many Americans, the fact that they were forced to become less wasteful, proved a welcome relief. They did not have the willpower to do it on their own. Being less wasteful, proved to fill them with a deep sense of satisfaction". While Americans embraced waste management for fear of inflation, recession, unemployment as well as scarcities, they did not abandon aspirations to more income. Other opinion surveys conducted by National Opinion Research Institute, Harris and Roper, arrived at conclusions of similar sentiments. It would follow that national crises constitute an excellent opportunity for Governments, schools and Churches to induce their constitu-

encies to adopt a quite less wasteful mode of living.

The opinion polls also point to the necessity to relate waste management to an integral program of enduring economic growth — in the nation, the corporations and the pocketbooks of the voters. Such a carrot-and-stick approach would demand a waste-added tax. There are some precedents: France levies a tax on junked tires; Switzerland on discarded automobiles; West Germany on wasted oils. Governments may also subsidize energy conservation, resource recovery and waste treatments, where possible through the fiscal route.

However, regardless of such official impositions, there is an urgent need to strike a responsive chord with consumer and producer, voter and neighbor, to engage voluntarily in a waste management effort — in office, factory, community and home. It is more comprehensive than turning off the lights, making breadpudding out of stale bread or moving thermostats up or down. It requires a new set of building blocks for the economy and for economic growth.

Perhaps compulsory and voluntary waste management might prove a matter of changing status symbols. A shoeshine is a symbol of prosperity; a shine on the sleeve one of indigency. The informal way people spend their vacations may forebode a readiness for a less formal way of life. It translates into a divorce between incomes and lifestyles. Citizens may move away from purely acquisitive attitudes to person-centered or community-oriented activities.

The Crux of the Matter

The heart of the matter is the ultimate application not only of money but also of other resources, as they are freed by waste management. It is amply demonstrated that services grow at a much faster pace than products. The computation of housework and creative leisure activities would only enhance this trend. Hence the thesis that a waste management-induced service economy would ensure sustained economic growth. This is the more valid because waste management relaxes limits to growth, whether due to ecological constraints, scarcities or cost factors. These limits have been abundantly analysed in the Club of Rome's and other studies.

Progress is more often achieved under duress, revolt or war, than out of foresight or enlightened self-interest. In the final analysis, it is the constituencies' choice. Having been flooded with proposals for a less wasteful way of life, will they suffer from a drought of flexibility, imagination, and political will?