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With modern biotechnology the world has discovered a vast new field which is full of potential for creative activity and, for the scientific community at least, patentable and profitable innovations.

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On safe drinking water

Let me respond to your recent feature on new molecular technologies for safe drinking water (*Observer* 216, January 1999). Although the water sector is correct to be concerned about the wholesomeness of drinking water in OECD countries, the health threat there is not so great. Improved detection and treatment techniques will keep those countries' drinking waters to a high standard of fitness for consumption. The richer countries of the world have the will, the wealth and the skills to do this.

The real problem is in the poorer countries of the world. Bad though the statistics you present are, they understate the true extent of the problem. Each year some 700 million people are infected by diseases from contaminated water. Up to one half of the population of the developing world suffers from one or more of the six main diseases associated with poor water supply and sanitation. The consequent loss of productive capacity in these countries' economies is staggering, let alone the resulting misery for the individuals and families concerned.

Clean drinking water is not the sole solution to these problems. Safe disposal of human wastes (good sanitation), sound domestic hygiene practice, good nutrition and immunisation all play important roles. However, the role of good water supply and sanitation is crucial and herein lies one of the great challenges.

Conventional water and sanitation systems are hugely capital intensive, have high energy consumption and need advanced skills to operate properly. There are few, if any, tried and tested alternatives that can be applied at urban area scale. This lack of acceptable alternatives is a big problem. The situation is analogous to that in the early stages of the mid-20th century birth control campaigns. Then, the lack of a range of alternatives made initial take-up rather slow. As soon as the range of options increased, the take-up rate accelerated.

Growing population and the trends towards urbanisation will bring vast numbers of people into towns and cities in poor countries. Unless there is a big acceleration in safe drinking water and sanitation provision, large-scale health disasters seem certain. A wider range of choice of technology is essential, based on high science but low cost and appropriate skill to construct and operate.

The question is what might spur on the development of these alternative technologies. Disasters will certainly, but why should the world wait for these before responding? In fact there are powerful arguments for introducing a global freshwater convention soon, containing an enshrined right to a minimum quantity of water of human quality for everyone on the planet. If governments will set a framework in this manner and implement it, a climate for innovation can be created. The private sector can respond with the development of new methods and the provision of the needed services. This would involve significant economic activity – building, installing and maintaining the needed facilities.

Some doubt the capacity of the poor to pay for these services. But presently, many poor people pay a high proportion of their income for limited water supplies of poor quality from street water sellers. Studies have shown that these poorer people can and will pay for decent water services. The potential demand is there and will rise. The catalyst to precipitate change and innovation is the crux of the matter. The suggested freshwater convention could very well be it.

ANTHONY MILBURN,
Executive Director,
International Association
on Water Quality, London

On China's future

I would like to congratulate you for the recent article on China by Colm Foy and Angus Maddison (*Observer* 216, January 1999).

You judicially summarise China's potential. The very long historical perspective you choose is sound. In the long run, indeed, China could become what it had been for a quite extended period of time, back in history.

However, the road is still long, and far from easy. First, China's leaders will have to unleash the creativity and entrepreneurship of their people. But will this happen in a 'plausible' future? Also, key problems of public finance, law and international trade could delay, if not halt, China's resurgence.

Moreover, geostrategic and economic threats lurk not only along China's extremely long and diverse boundaries, but among her neighbours, which could be cause for concern. This is a point to which you might have devoted more space.

FRANÇOIS NDENGWE
Public Policy & Strategy, Paris

Observers Past

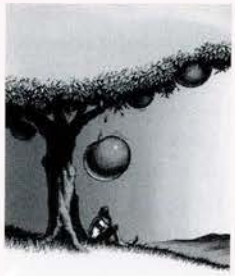
Thirty years ago

In large enterprises the role of management is decisive. The hierarchy of management is gradually replacing the owners of capital as the dominating factor in industry. This not only makes management as such an important art or technique, it also explains why labour-management relationships are becoming so important at the enterprise level.

Thorkil Kristensen
Secretary-General
March 1969

A defence of modern biotechnology

DONALD J. JOHNSTON, SECRETARY-GENERAL OF THE OECD



Within the developed world, food has never been safer, life expectancy never longer. Yet scares, recently over mad cow disease and now over genetically modified food, have pushed biotechnology high on the popular and political agendas in several countries, with accompanying regulatory battles, public showdowns and trade disputes. Public opinion appears divided, with all sides making sense and at the same time adding to the confusion. The trouble is that amid all the noise, virtually anything to do with 'genetic engineering', whatever the benefits, is in danger of becoming taboo.

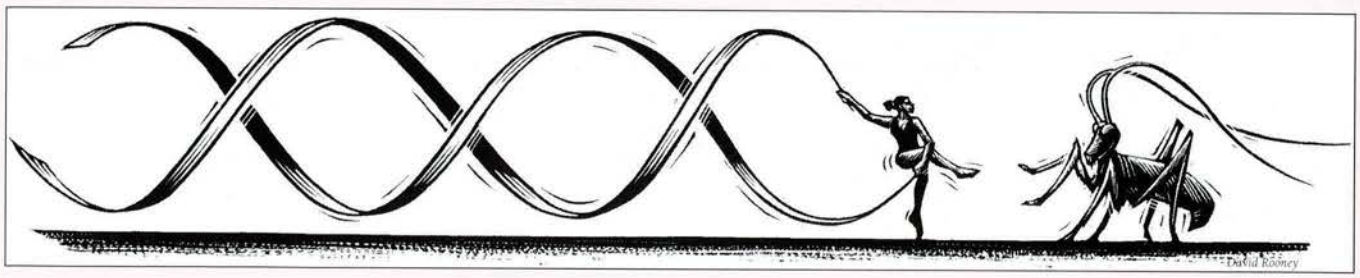
Picasso's cry, 'I do not invent: I discover!', has a particularly true ring for today's scientists in the rapidly growing field of biotechnology. It reminds us that the DNA strands in every living cell are the world's oldest digital data tapes – not something created by Crick and Watson in 1953. Indeed, biotechnology has been with us, albeit in more primitive modes, since the time of *homo habilis*. The difference now is that those data tapes are being read, at high speed and low cost; in the first tentative scribblings of our genetic engineers, they are even being edited and re-spliced. In short, with modern biotechnology the world has discovered a vast new field which is full of potential for creative activity and, for the scientific community at least, patentable and profitable innovations.

There are strong links between current projects to read, or sequence, human and other genomes, and the advent of the knowledge-based economy of the 21st century. The new knowledge and techniques are of fundamental significance in dealing with agro-food, health care and the environment. In fact, they are essential for making the transition to a sustainable world economy. Such knowledge is permanent, pervasive, disruptive, sometimes even subversive. Like it or not, it is irreversible. And thanks to the Internet, the knowledge is globally available.

Applications are proliferating, in sectors old and new. There are few inhibitions in acceptance of safer vaccines, and remedies for hitherto incurable diseases. But when it comes to applications on the farm and in the food supply, the new knowledge is proving hard for some to digest. This indigestion might be cured by better communication and greater transparency, to assure the reluctant consumer of the benign intentions of scientist, farmer and food processor. Transparency through consumer information is today a normal and perfectly laudable expectation. But it does raise practical questions. How to transmit that information is one issue. Another is to decide what information is in fact 'relevant', what should be obligatory and what best left to normal commercial self-interest.

Transparency through consumer information is today a normal and perfectly laudable expectation. But it does raise practical questions.

Consumer concern has recently been heightened in some countries by active campaigning against genetically modified organisms, particularly in food products. It is an emotive debate, with science caught



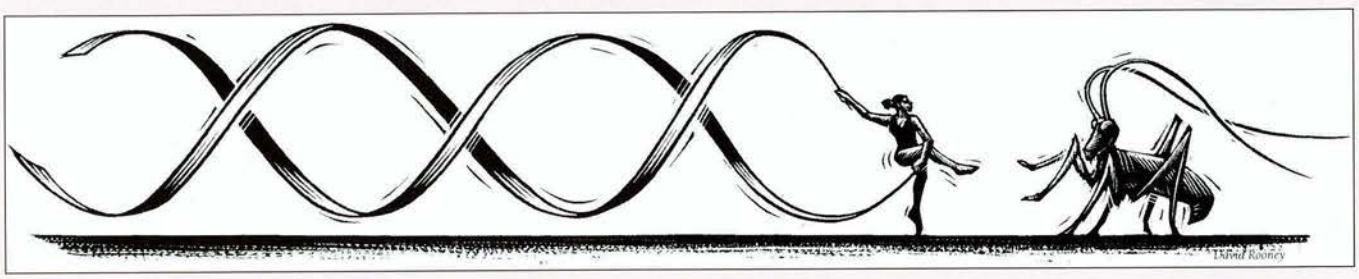
in the middle of it. A clear political lead is therefore needed. The trouble is that short-term political pressures do not always influence policies for the better. They can lead to *ad hoc* regulatory interventions, which focus on and stigmatise new techniques, duplicate existing systems and lead to needless bureaucracy and the occasional trade dispute. How can all this be avoided? Can the OECD do anything to help?

Many years have passed since the first high-profile debates about the safety of genetic engineering which followed the February 1975 conference at Asilomar, California, when scientists imposed a temporary moratorium on certain experiments. The OECD became a key forum in the international safety deliberations of the 1980s. It brought together the collective scientific expertise, policy judgement and increasing experience of its Member countries. Our contribution to the work is substantial and is outlined in the Spotlight pages of this *Observer*.

Work at OECD continues on developing and publishing expert consensus papers, to help regulators evaluating the safety of a growing number of major crop plants and traits being modified by modern biotechnology. At least now in the developed world we have well-established systems for managing the safety of food, pharmaceuticals, agrochemicals and many other novel (and generally safer, more precisely crafted) products that are now appearing. Rather, it is the developing world which has the greatest need for the new knowledge and techniques promised by biotechnology. Unnecessary delay could have disastrous consequences for the food security of millions.

And there should be no illusions about what is at stake for the environment either. Crops like cotton, whether in the United States or India, receive vast tonnes of chemical pesticides which linger in the environment and accumulate in food chains. Crops with built-in pest resistance via modern biotechnology greatly reduce the need for pesticides. The simple fact is that current, so-called 'traditional' agricultural practices are polluting. In contrast, cultivation using biotechnology can reduce pollution.

The rapid progress of modern biotechnology poses many challenges to public policy: in education, health care, research, intellectual property – which in a knowledge-based economy has a new, higher importance – and in industry, as companies attempt to manage and use new knowledge. There are issues of financing the global infrastructure for biotechnology – the databases and the collections of microbes, cell lines, seeds and other key biological resources – who pays and who benefits. There are also issues of privacy, data protection, property rights and public interest. The questions are many. The OECD can help policy-makers everywhere to find the answers. In the meantime, the knowledge mill will not stop grinding – and why would anyone want it to?



Unblocking Japanese reform

AKIRA KAWAMOTO, TRADE DIRECTORATE

Japan's economic reforms could lose their edge if they get caught up in the country's institutional machinery. Determined action is therefore needed to prevent that from happening.[1]

The troubles of the Japanese economy have been well documented by now. GDP fell by about 2.6% in real terms in 1998 and a weak performance is expected in 1999. Unemployment is expected to remain dispiritingly high by Japanese standards and, although the yen looks to have strengthened, the saga of suffering financial institutions seems to be never-ending. The impact of Japan's problems on other Asian markets and the knock-on effect around the world have been striking, making the need to tackle deep-rooted structural problems clearer than ever. That at least has been recognised by the Japanese public and their political leaders and some progress in tabling reform has been made. In fact, the Japanese government has asked the OECD to conduct a broad-based review of regulatory reform in Japan; at the time of writing that review was under way, with the final report expected later in the spring.

The challenge for Japan is a formidable one. Many of the economy's structural problems have an institutional dimension. There is nothing unusual about that – other OECD countries have over the years been under pressure to undo age-old practices which block growth. But Japan's institutional set-up is particularly rigid and it will take a dogged effort to change it.

Not that the Japanese government is in any danger of underestimating the tasks that lie ahead. It has already devoted significant resources to formulating and ensuring the implementation of the Deregulation Action Plan it introduced in 1995. Early initiatives were courageous enough. Indeed, they would have been unthinkable only a few years before. For example, the government allowed two major financial institutions to fail, rather than intervening to bail them out. Its deregulation package has led to a substantial fall in petrol prices, as well as to the first new entrant, Skymark, to the domestic airline business in 35 years. Meanwhile, the government's independent Economic Strategy Council has recently come out with daring recommendations to change the civil service and even to abolish Japan's unwieldy public trust fund.

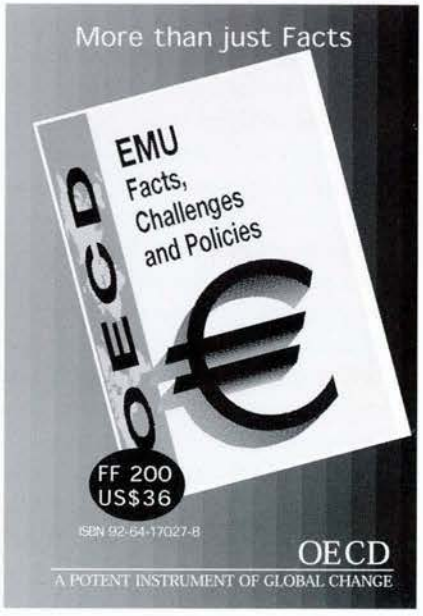
> The approach to reform has to be re-assessed, otherwise the objective of a durable recovery could become elusive

These changes have clearly strengthened the government's reputation. However, despite recent breakthroughs in addressing Japan's troubled financial sector, questions remain about the government's capacity to carry out more difficult reforms which lie ahead.

So far it is pressure from global trading partners which has largely been responsible for bringing about the recent policy initiatives in Japan. This is partly because trading partners tend to see Japan's internal regulatory environment as having a direct bearing on their trading interests too. But there are limits to what their pressure can achieve. Japan has to act for itself, to define its goals and to decide how they can best be achieved. The impediments to change have to be clearly identified and vigorously tackled. And as part of the exercise, the effectiveness of the approach to reform has to be re-assessed and the entire programme given some fresh impetus. Otherwise the objective of a durable recovery could become elusive.

A legacy of detail

The first problem to look at is the Deregulation Action Plan itself. It got off to a good start in 1995 and has played a key role in facilitating some worthwhile changes. In fact, the decision to allow the new airline entrant was made possible thanks to it. But even from a regulatory expert's point of view the sheer size and detail of the Deregulation Action Plan is overwhelming. The 1998–2000 plan now consists of about 600 reform items, although as before,



1. The views expressed in this article are those of the author and do not necessarily represent the official views of the OECD.

that number may well grow. Each individual detail might make sense in its own right, but it is extremely hard to get a feel for where the sum of the measures will take the economy. A small example is reform in the energy sector, where electricity generation has been opened for tender. In spite of the high take-up, it is still uncertain that the outcome will, or is intended to be, lower prices. There is a similar lack of clarity running throughout the action plan. In the end, whether or not a more competitive, market-oriented Japan will emerge from the reforms is an open question.

It could be argued that the plan lacks a firm political hand to drive it forward and give it overall shape and coherence. Questions have to be asked about its content, its meaning and purpose. What will the plan's overall impact be on competition or on labour markets, for instance? In some respects, the Deregulation Action Plan, which has been extended to run for another three years, resembles a car plant where the individual component experts working alongside each other have not considered whether the car they are building will actually start.

Japanese reform would be strengthened if broad goals, such as competition and transparency, were made clearer and more up front. Numerous deregulatory measures, such as those removing restrictions on foreign exchange, have been introduced to the financial services sector. But the lack of transparency in the procedures for approving new financial products and in building the rules governing the sector remains a major problem which has not been properly dealt with. This is a worry, since the discretionary powers of ministerial departments and the need for their prior approval are one of the causes discouraging innovation in the first place. As a result, the financial markets are still not convinced that the ministries are committed to a true competition agenda. After all, talk about igniting the entrepreneurial culture is very well, but enterprise needs competition to spark it.

The abolition of the 'demand and supply adjustment' clauses, which were essentially discretionary clauses intended to restrict new entry into various markets, such as transportation and telecommunications, has been widely welcomed. But here again, there are outstanding issues to be resolved before market competition can be realised. Some of these might not be unique to Japan, but that does not make them easier to resolve. For example, Japan's main telecommunications company, NTT, still controls the internal network and new entrants in the market are discouraged by high entry costs. Unless the ministerial departments responsible for reform show a clear and thorough commitment to competition, the impact of even the most positive reforms will be weakened, inhibiting new entrants as well as possibly discouraging long-term investment.

Ratio of *amakudari*[1] board members

selected Japanese industries

Industry	Number of firms	Number of *amakudari* board members	% of total board
Regulated			
Construction	30	150	12.8
Second regional bank *(Dai-ni Chigin)*	30	60	11.4
Telecommunications	4	13	9.7
Air transport	5	11	8.2
Regional bank *(Chigin)*	30	36	5.7
Electricity and gas	20	20	3.9
Unregulated			
Steel	30	6	0.9
Automotive	30	6	0.9

1. *Amakudari* are former officials from central or local government as well as public corporations (including the Bank of Japan, but excluding the former Japan National Railways); the firms surveyed are the listed companies with the largest sales in each industrial category.
Source: Tokyo-Shinpo-Sha, 1997

Decision-making has to be sped up

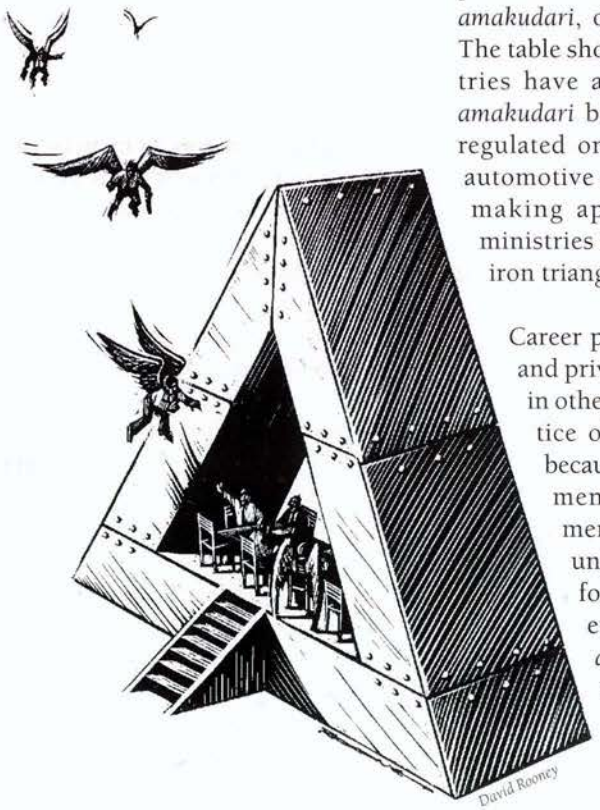
Slow and incremental decision-making is a particular problem in Japan. Such is the nature of its institutional structure. Of course, any government undertaking reform has to avoid social disruption and to cater for a range of interests. Reform often has to be steered through political minefields. But in Japan there is simply too much room for delaying tactics to be used by the regulatory agencies and ministries whose interests may run counter to the spirit of competition reform. Again, evidence of this can be seen in the financial sector. Akiyoshi Horiuchi, a professor at the economics faculty of Tokyo University, recently commented on the unusual slowness with which bad loans were being handled, which he surmised as being part of the attempt by the finance officials to protect the weaker institutions from going under.

The decision process in matters concerning deregulation is arduous. Typically, new rules and reforms are proposed to the Deregulation Committee. After a long discussion, the authorities agree to modest revisions, taking care not to commit themselves to anything long-term or fundamental. They also have a veto to stop the reforms if they feel they need to. There are plenty of illustrations of the effects of this lengthy procedure. For example, it took more than ten years from the original US request for Japan last year to scrap its Large Retail Store Law restricting the expansion of large supermarket outlets. Another example is the abolition of the domestic shipping cartel, which was finally agreed in 1998 after long discussion in the Administrative Reform Council. The catch is that a transition arrangement

has been worked out too, which will keep the cartel effectively alive for another 15 years.

Behind this slowness is the foot-dragging of powerful groups determined to resist fundamental change in government practice. These are the so-called 'iron triangles', made up of backbench and local politicians, businesses and the administrative departments. Such bonds may not be peculiarly Japanese. In fact, the phrase comes from US political science. But in Japan iron triangles are extremely powerful and, in most cases, they are led by government bureaucracies. The institutions which make up the iron triangle tend to offer prestigious and stable career prospects to highly qualified and committed staff.

Iron triangles cover both the public and private sectors and are pervasive even at local level. They are in many cases bolstered by the legal framework, or basic foundation law, which gives ministries influence in the business sectors they are concerned with. Moreover, bureaucracies can cite the greater public good to control regulated industries and can draw on specific legal provisions to back them. Because Japan lacks a competition authority or other administrative/judicial tribunals with teeth to resolve any differences of opinion with regulatory agencies, these discretionary powers make Japan's government departments particularly influential.


David Rooney

The descent from heaven

Such is the power of the administration that business has a strong incentive to stay on its side. One favourite way of doing this is for companies to appoint recently retired administration officials to board positions. As nothing is quite as high as government, this practice has been dubbed the *amakudari*, or descent from heaven. The table shows that regulated industries have a higher proportion of *amakudari* board members than unregulated ones, for example in the automotive sector. The practice of making appointments from the ministries simply strengthens the iron triangles.

Career paths between the public and private sectors can be found in other countries, but the practice of *amakudari* is unusual because of the Japanese attachment to life-long employment. This puts ministries under pressure to find posts for their retiring officials every year and fuels the *amakudari* practice. Recent scandals have thrown the habit into question, but if the fundamental incentives to hire former officials are not changed, *amakudari* is unlikely to disappear.

Reaching out

Policy-makers tackling Japan's economic problems always have to take this underlying institutional structure into account when embarking on reform. Changing long-standing practices in the interaction between government and the private sector is not easy to achieve in any country. Yet, without change other reform policies might simply run aground.

Fortunately, Japan's problems are not insurmountable by any means, though some new ideas may be needed. For inspiration, the government could look at changes taking place locally. The US federal government has found this approach to be useful, for example, in airline deregulation when it was inspired by reforms that were successfully implemented in the state of California.

But while relying on internal initiatives is clearly important, looking for international solutions might also prove fruitful. Economic policy-making in several European countries was in a state of inertia too in the period after the Second World War. The projects to build the European Community and latterly the single market and monetary union have helped to lift individual nations out of their domestic mires, freeing up trade and capital flows and stimulating growth. The problems Japanese policy-makers face may in many ways be different from those of their European counterparts. But it is precisely because Japan's problems affect markets beyond its borders that reaching out in search of durable solutions would be a positive step. After all, Japan and the world economy would only benefit. ■

Slovakia at the cross roads

MAITLAND MACFARLAN AND JOAQUIM OLIVEIRA MARTINS, ECONOMICS DEPARTMENT


OECD
Finance minister Schmögnerová

After a period of strong growth, the Slovak economy has reached a turning point. Macroeconomic imbalances have become unsustainable and a more stable development strategy is now required. Designing and implementing that strategy has been the main task facing the new government.

A co-ordinated approach to reform and macroeconomic stabilisation: that is the central recommendation of the latest OECD Economic Survey of the Slovak Republic.[1] The new government which emerged from the parliamentary elections of September 1998 appears to agree and has signalled its determination to act on that front. Notably, a key element of its adjustment package approved in January 1999 is a substantial fiscal tightening. The target for 1999 is a general government deficit of the order of 2% of GDP, down from above 5% in 1998. The government hopes to achieve this objective by reducing public infrastructure investment, putting a freeze on government wages and raising excise taxes.

The new government programme also aims to accelerate the restructuring of state-owned banks and enterprises. This is good news. The two large state-controlled banks, holding around 40% of total banking assets, have a large burden of bad debts and they badly need to be recapitalised and probably privatised. Another bank – the Investment and Development Bank, IRB, which had around 6% of total assets – failed in December 1997 and was placed under the direct administration of the National Bank. In 1998 over a fifth of total bank claims were in the substandard, doubtful or loss categories, mostly the latter. Although banks have accumulated substantial provisions for bad loans there are concerns about the quality of collateral.

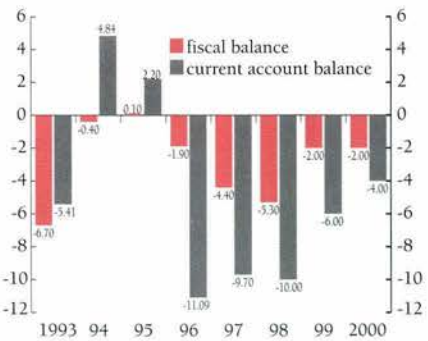
Whatever approach is taken to tackle the restructuring of the banking sector, its impact on public finances has to be made clear from the outset. And there should be no delay in acting either, since the health of the economy depends on having sound banking. Combining recapitalisation with privatisation is clearly the way to go, while encouraging the participation of foreign strategic investors would bring in more capital and expertise, areas in which Slovakia is lacking. The fact that in its economic programme the new government clearly recognises the importance of involving foreign investors in the bank privatisation process is to be welcomed. Indeed, in the past there were proposals to privatise banks to companies which were themselves large debtors of the banks, thus creating risks of a further weakening in financial discipline.

> The new government aims to accelerate the restructuring of state-owned banks

Exactly how much enterprise restructuring is needed is hard to say. Progress has certainly been made since the early 1990s, when the industrial scene was dominated by large industrial conglomerates, with few linkages with the surrounding economy and specialising in the military industry and production of basic intermediate goods. Since then, many businesses have been through major adjustments in productivity, products and markets. There are several cases of firms which have gone very far in their restructuring.

However, on the whole, company financial difficulties are still evident. Most indicators show declining profits, deteriorating liquidity and rising debts. The latter are not only bank loans, which tend to be non-performing, but also increased debt to other companies and in the form of tax arrears. There is a hard core of firms in real difficulty, firms which have yet to take even the first steps towards restructuring. Typically, this is the case of large regional employers, whose ad-

Financial balances
% of GDP



1998: estimates
1999, 2000: projections
Source: national authorities and OECD

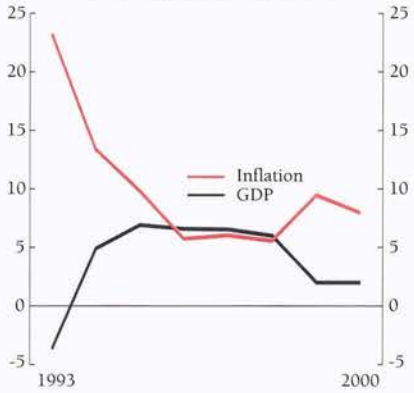
1. The Slovakia Country Survey was prepared with the support of the Centre for Co-operation with Non-Members (CCNM) as a fundamental part of the OECD's programme with non-member countries.

Strong growth could not continue

The structure of the Slovak economy seemed particularly rigid at the outset of the transition process. For this reason, the good macroeconomic performance of recent years came as a surprise. Fuelled initially by exports, real GDP growth resumed in 1994 and has remained buoyant, at around 6% per year, while inflation has declined substantially. In 1996 the emphasis of growth shifted, from being export to demand led, largely thanks to a fiscal loosening and the coming on stream of large public and private investment projects.

The immediate result of all this has been an explosion of the current account deficit, which has stood at an average of around 10% of GDP since 1996; it used to be in surplus. Slovakia was able to finance this deficit by borrowing significant international funds. This may have helped to maintain the economy's momentum, but at increasing cost. The independent central bank's response to these growing imbalances and, in 1997, to the deteriorating international environment was to tighten monetary policy and slow domestic demand. It also set itself the task of defending the fixed exchange rate regime – that was against a currency basket comprising the deutsche mark and the dollar. The regime was abandoned in October 1998 and the currency, the koruna, was allowed to float.

Growth and inflation trends



1998: estimates
1999, 2000: projections
Source: national authorities and OECD

The burden of high real interest rates resulting from the restrictive monetary policy was aggravated by delays in enterprise and financial restructuring. The financial situation of the enterprise sector deteriorated considerably, as reflected in an increase of payment arrears and bad debts. Tax arrears also grew, contributing to revenue shortfalls in the state budget and increasing public deficits. The latter peaked at over 5% of GDP at the end of 1998, whereas it was in balance in 1995.

The main problem for Slovakia over the last two years was not so much a lack of growth, but too much of it; the economy was in fact on an unsustainable path. The central bank did well to act and is keeping monetary policy tight, now that the currency is floating. Without this action by the bank and the prospects of improved fiscal discipline, then the result may almost inevitably have been a sharp, perhaps more painful, correction.

justment has been held back by social concerns, the main one being the difficulty of shedding labour in regions where alternative jobs are few. These problematic large enterprises had been granted special protection under such measures as the Strategic Enterprise Act and the so-called Revitalisation Act; the latter raised unrealistic hopes about financing and may have aggravated the debt situation, which is why it was wisely abandoned by the new government.

Slovakia's continued state ownership of 'strategic' enterprises, including natural monopolies such as the gas and electricity companies, and the major financial institutions needs to be addressed. In providing financial facilities to other firms by keeping prices artificially low, or allowing payment arrears, some of these large companies have been the first link in the chain of indebtedness and therefore have contributed to the poor financial discipline. According to the new government's programme, some of the distortions arising in state-owned enterprises are to be removed by bumping up regulated prices, a process which has begun with a substantial increase in the once heavily subsidised electricity tariffs.

The risk of a prolonged contraction

The main difficulty facing the new government is that structural reforms have been insufficient, impairing the

emergence of more diversified, export-orientated sectors and allowing inefficient and sometimes import-intensive enterprises to continue in operation. High public deficits have also crowded out investment in new activities, further exposing underlying weaknesses on the supply side of the economy.

The slowdown in the economy should be viewed as part of the adjustment process. The magnitude and duration of the slowdown will depend on both international and domestic influences. There is the fiscal contraction to consider, while external financing constraints will act as a further break on growth. Weakening demand in the world economy will also impinge on Slovak exports and, on the domestic market, real incomes may be lower as a result of tamer wage growth, currency depreciation and increases in regulated prices. Clearly, the signs do not point to a strong pick-up in trade and investment flows.

Therefore, the risk of a prolonged contraction has to be acknowledged. This would clearly hinder the government's drive for deep structural reforms and affect the overall sustainability of the new policy framework. Nevertheless, credible progress with the reform programme should contribute to an increase in investor confidence and help to attract foreign capital into the economy. This would ease the external financing constraint and provide the resources needed for restructuring. And if the government manages to get the transparency it wants and the policies it needs for reform, its chances of integrating Slovakia into the group of established market economies will improve. ■

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Reforming Greece's public enterprises

ISABELLE JOUMARD AND PAUL MYLONAS, ECONOMICS DEPARTMENT

Greece is a candidate for entry into the euro area in 2001. To perform well once in EMU, it will have to step up its efforts of reforming its public-sector enterprises by introducing more competition and improving management.

Greece's economy has made great strides forward since the beginning of the 1990s. Inflation has fallen sharply, as has the budget deficit. More recently, growth has begun to accelerate, exceeding 3% in real terms in 1997. It is on the strength of progress like this that Greece has set itself the objective of entering the euro area in 2001.

Nevertheless, significant challenges lie ahead. When it comes to structural reforms Greece lags behind most other OECD countries. The case of public enterprises is a perfect example.

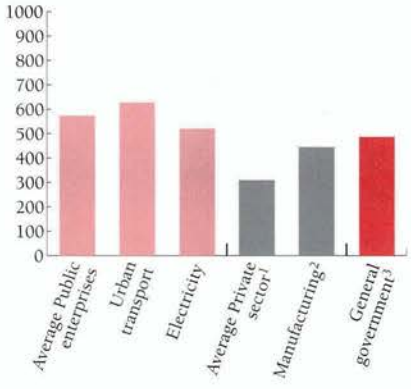
Other OECD countries have demonstrated that restructuring of public monopolies and the introduction of competition make it possible to improve quality of goods and services and, in many cases, at lower prices as well. OECD calculations show that an ambitious reform of Greece's public enterprises could generate a one-off increase in real GDP of as much as 10%, which would help boost employment. It would help relieve pressure on public finances and debt. This is very important for a country like Greece, where public enterprises each year claim a share of the national budget equal to 3.5% of GDP and where the general government debt exceeds 100% of GDP.

In 1996 the Greek government embarked on a programme to restructure public enterprises. The focus is on improving management, although more competition is also badly needed. Although government initiatives in this area have been encouraging, much remains to be done if Greece is to perform well once inside the common currency area.

Poor performance

A number of factors are responsible for the poor performance of Greek public enterprises. Up to the early 1990s they were expanded to create employment, usually around election time. Their financial performance thus suffered from a policy of price restraint and cost growth. Today public enterprises are overmanned and productivity is below that of other OECD countries. Real wages have risen steeply, outstripping productivity and wage growth in the

Average compensation per employee, 1997
monthly compensation (thousand Drs)



1. Excluding public enterprises and state controlled banks.
2. Average of blue and white collar workers.
3. Assumes employer social security contribution rates equal to that in the private sector (28%).
Source: Ministry of National Economy

private sector. And by 1997 the average pay of public enterprise employees was 30% higher than in private-sector manufacturing.

Pricing policy, too, was often out of line with business management criteria, reflecting high costs, technology shortfalls and social obligations. Prices in certain public services were often frozen to guarantee access for the whole population, or indeed as a way to contain inflation. Nevertheless, prices of certain services, especially telephone and electricity, are higher than in other OECD countries because of limited competition and a weaker technological performance.

Mark Henley/Cosmos

Gearing up for EMU

Close the technology gap

There are wide technology gaps between Greece and its EU neighbours, as inefficient technology and equipment have affected public enterprise performance. For example, the national telecommunications company, OTE, runs of the least digitalised services in the OECD area. And the electricity-generating capacity of the public power corporation is barely equipped to meet peak load demand safely.

Since the early 1990s there has been substantial investment, largely financed by European Union funds. Over the period 1994–99 the main public enterprises will have received Ecu6 billion, equivalent to 6% of Greek GDP.

Greece's public enterprises fulfil heavy service commitments without matching compensation. Their cost is difficult to appraise accurately because most enterprises do not keep separate accounts for individual operations. In general, the absence of transparent accounting practices is an impediment to progress in reform, especially in the area of cost containment.

The first step: priority for management

Improving management is a primary objective of the government's reform plan. New managers have been hired with specific strategies in mind and each public enterprise has had to prepare a business plan. One of the aims was to reduce labour costs by way of attrition, through voluntary departures. They are positive initiatives, though if they are to succeed fully, the new management teams should be given a sufficient degree of independence in policy matters, notably employment, pay and award of contracts, compared with the previous rigid interventionist approach.

One reassuring advantage for Greece as it embarks on its reforms is that it can draw on the experiences of other countries which have already been down the same path. One lesson is that a well-designed regulatory framework is essential – it helps to bring new entrants into the market, to boost quality and reduce prices. The partial liberalisation of the air transport and mobile telephony markets in 1992 has already demonstrated this. Two private operators were granted the mobile telephony licences, resulting in a wider range of services than would have been possible otherwise. And in internal flights market, liberalisation has resulted in keen price competition led by several domestic private carriers.

Despite these successes, air transport and telecommunications remain key sectors where competition is still needed. Pressure to reform these two sectors quickly is bound to increase as the respective EU markets open up more and as technology advances further.

But for the public airline company, Olympic Airways, the issue is also quite simply one of survival. The restructuring plan approved in 1998 was not ambitious enough and problems have already been encountered. The company should align itself with practice elsewhere. Labour costs, which

rose by over 50% 1996–97, need to be cut to raise productivity, which is nearly half that of the company's chief competitors. The company should also move out of long-range flights, which are largely loss-making, and concentrate more on core services. A strategic alliance with another airline would enable it to strengthen its advantages on medium-range flights, particularly to the Middle East.

> For the public airline company the issue is simply one of survival. It should move out of long-range flights and concentrate on core services.

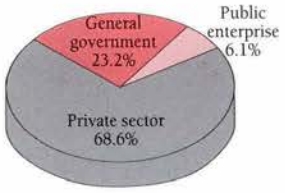
The national telecommunications corporation is a somewhat different case: despite high costs, it is one of the country's most profitable enterprises. In fact, OTE's sizeable profits owes much to a high phone charges – particularly for long-distance and mobile calls – which it has been able to maintain in a rapidly expanding market. The introduction of competition in the basic telephony market has been delayed until 2001. Yet, it is nearly as developed as networks in other OECD countries, such as Germany or Spain, where the telephony markets have already been opened. When new operating licences are awarded in Greece, prices will surely drop.

Electricity: a public monopoly

Another of Greece's public enterprises requiring critical attention is one of the most important of all, electricity generation. Competition there is almost non-existent. The sector is still dominated by a public monopoly, which controls services at every level. The public power corporation, DEH, accounts for 98% of electricity supply and generating capacity. It controls the high-voltage transmission grid and the low-voltage distribution network. Its market advantage is further strengthened by Greece's isolated geographical position with regard to the rest of the EU. DEH also enjoys preferential access to fuels and to public funding. Common financial interests among electricity, natural gas and oil clearly do not promote competition between these public sector enterprises.

The government plans to 'unbundle' DEH's accounts in accordance with Brussels directives, but without splitting its activities into legally independent firms. The positive aspect is that the corporation's accounts will be more transparent. And part of the power generation market will be opened to competition, again in accordance with Brussels. Although DEH will still have a strong competitive edge that will deter new entrants, extra effort to encourage private investment will make it possible to better meet fast-expanding demand without drawing on public funds.

Share of employees,[1] 1997



1. Total does not add up to 100 because state-controlled banks are excluded.
Source: Ministry of National Economy

Less costly solutions

Price restraint may very well reflect a laudable social goal, by making some public services available to the most disadvantaged population categories. But that goal may be attained in a more focused manner and at lower cost. In the case of rail services and urban transport, it would be possible to adjust fares to operating costs and at the same time introduce a direct transfer to the poorest households, for example, in the form of allowances. The alternative would be to call for tenders and award the operation of certain lines to the best bidder.

The restructuring measures taken by the Greek government need to be strengthened and accelerated, with allowance made for differences between sectors as to the type of competition that can be introduced. This will mean setting up independent regulatory authorities to guarantee fair practices. In another context, although public enterprise reform should improve the economy's growth potential in the medium term, in the short term it may result in some job losses, given the extent of overmanning. To minimise the social costs of these changes, better protection mechanisms may have to be introduced for those who lose their jobs as a result of restructuring, while at the same time pressing ahead with labour market reform to improve employment prospects in general.

These vital reforms are challenging indeed. If Greece succeeds in carrying them out, the reward will be the economic strength needed to perform well in EMU. ■

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The income taxes people really pay

FLIP DE KAM, FISCAL AFFAIRS DIVISION AND CHIARA BRONCHI, ECONOMICS DEPARTMENT

When comparing different tax systems, most people tend to look at top rates of personal income taxes imposed by central government. However, concentrating on these 'headline' rates can be misleading. In the first of a two part series, Flip de Kam and Chiara Bronchi explain why.[1]

In all OECD countries central government levies a tax on personal income. The rate structure of these income taxes shows wide variation. Our focus here is on top marginal rates, that is the highest percentage of tax imposed on every additional dollar, yen, deutsche mark or franc earned above standard taxable income levels. Most studies compare only the top rates of personal income tax imposed by central government. However, 22 out of the 29 OECD countries also levy other taxes on personal income. Consequently, any cross-country study of tax systems that does not take into account the combined rate of all taxes on personal income will not grasp how top income taxes in the OECD area really look.

The fundamental structure of personal income tax systems imposed by central governments is very similar in every OECD country. A certain amount of income may be exempted from tax. That's the 'personal exemption' – also known as personal allowance. In some countries, the first slice of income is not exempted, but is taxed at zero per cent instead. This zero band has the same effect as a personal exemption. An alternative system is to tax all income, and give all taxpayers a reduction in their tax bill in the form of a 'basic tax credit'.

Even if the fundamental structure of income taxes from country to country is broadly the same, the tax bill for taxpayers in more or less the same position may be quite different. One major reason is that different countries provide different tax relief to their citizens. Expressed as a percentage of the gross wage of an average production worker, Greece exempts only 3% of the average worker's wage, Korea 7%, the Netherlands 14%, France 20%, and the United Kingdom and the United States offer relief to the tune of 24% of the average wage. The average production worker in Sweden pays no income tax at all to the central government. This is because the tax allowance is a tenth higher than his or her wage.

With the exception of Germany, which applies several tax formulae, income in excess of the personal exemption or zero-rated band is divided up into brackets. The number of brackets varies significantly; Sweden has one tax bracket, Iceland and Ireland have two, while Luxembourg, Mexico, Spain and Switzerland each have eight or more. All of the taxable income within a bracket is taxed at the same rate. The rate applied to the income in successive brackets increases. The result is a progressive tax: as total taxable income rises, a growing share of it goes – at least in principle – to the taxman.

Under a progressive system, tax relief is determined by the marginal rate applicable to the highest unit of income. So, as earners move into higher tax brackets, their tax relief actually rises in value. In other words, personal allowances and the value of the zero band go up, rather than down. In contrast, the value of tax credits is independent of the taxpayer's income level (see box). In 1998, nine countries used basic tax credits: Austria, Canada, Hungary, Iceland, Italy, Mexico, New Zealand, Poland and Portugal.

> Under progressive tax systems, as wage earners move into higher tax brackets, their tax relief rises in value

How progressive a given rate schedule depends not only on the amount of basic tax relief, but also on the width (or length) of the tax brackets, and the marginal rates applied to the income in each bracket. And income tax brackets certainly vary in size, while income taxes exhibit a remarkable variety of marginal rates, reflecting national views on what constitutes an equitable distribution of the tax burden.

Top marginal rates of personal income tax levied by central government range

David Rooney

1. The data used for this article comes from the OECD Tax Data Base.

from 25% in Sweden and 33% in New Zealand to as much as 60% in the Netherlands. In Ireland and New Zealand, taxpayers at the income level of an average production worker are already exposed to the top marginal rate of 48% and 33% respectively. In Austria, Belgium, Canada, Finland, France, Germany, the Netherlands and the United Kingdom workers must earn about twice the average before they start paying the top rate. On the other hand, Swiss and US employees are not confronted by the top rate unless their salaries reach ten times the average production worker's wage. In Turkey the top rate does not kick in until taxable income is 29 times the average wage and more. The table summarises the rate structure of the personal income tax levied by central governments in all OECD countries.

Before drawing any firm conclusions from this panoply of income tax schedules, three points should be borne in mind. First, the actual tax bill of individual taxpayers also reflects the impact of various deductions – for example, for mortgage interest and employee contributions to occupational pension plans – and exemptions – for example for capital gains or interest received. That means that effective tax rates in countries with lower statutory rates but little in the way of basic relief, deductions and exemptions, could well be higher than effective rates in countries which combine higher statutory rates with much more generous exemptions and deductions. The second point is one we made at the start, namely that in most OECD countries there are other taxes to pay on income, beyond that owed to central government. Finally, tax systems are often characterised by minor peculiarities, which while perhaps complicating matters slightly, do not have a major bearing on the general picture we have outlined here.

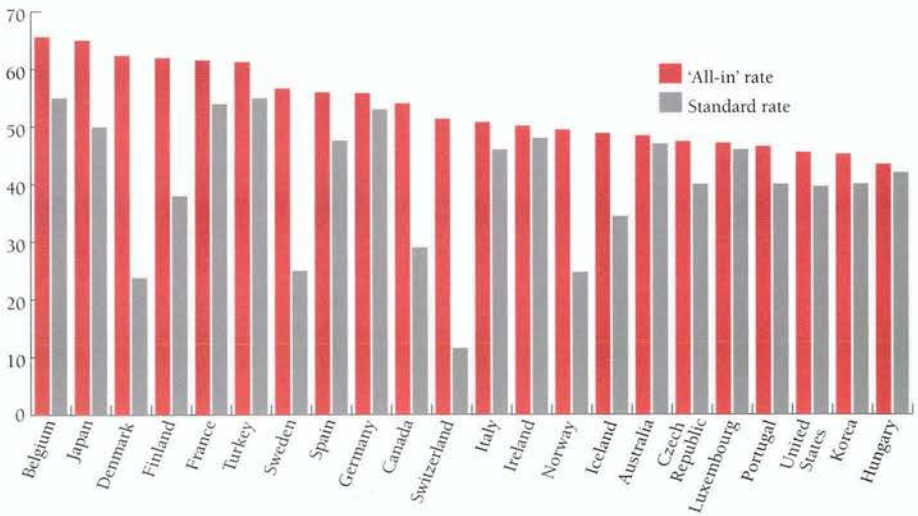
How tax relief really works

Basic relief for income taxpayers can be structured in different ways. Suppose that countries A and B have an identical tax rate structure consisting of four brackets. The first 20,000 of income are taxed at 20%, the next 20,000 at 30%, the next 20,000 at 40% and any income over 60,000 at the top rate of 50%.

In country A, taxpayers are entitled to a personal exemption of 10,000 (before the rates are applied). The tax bill of low-income earners in the first bracket is thus reduced by 2,000, since they save 20% of that 10,000 exemption in tax and pay tax only on the first 10,000 units. The tax bill for those in the highest taxed bracket is slashed by 5,000, since they are exempt from paying the 50% tax on their highest 10,000 units of income. In other words, as tax relief is determined by the marginal rate applicable to the highest 10,000 units of income its value increases with income.

Now in country B all taxpayers can claim a credit of 3,000 against their income tax. Here, the value of the tax relief is the same for each individual, regardless of the level of income. If the credit exceeds the income tax due but is considered 'wastable', the excess is not refunded to the taxpayer. If the credit is 'non-wastable', that means the positive difference between the credit and tax due is refunded by the fisc, the result is a 'negative' income tax.

Highest tax rates on wage income, 19981



1. OECD countries where the highest 'all-in' rate of taxes on wage income differs from the highest standard rate of personal income tax imposed by central government.
Source: OECD

Jacking up the tax bill

For several reasons, taxpayers in most OECD countries are often confronted by higher marginal rates than suggested by regularly cited headline or 'standard' rates of the personal income tax shown in the table. Cen-

tral governments sometimes impose temporary increases on the income tax, such as the austerity surcharge in Belgium and the German solidarity tax. Such surcharges jack up the total income tax bill.

Also, income earners may have to pay local, regional, provincial or state income taxes on top of the central government income tax. This is the case in Belgium, Canada, Iceland, Japan, Korea, the Nordic countries, Spain, Switzerland and the United States. In a few OECD countries local and regional income taxes are quite significant. In Sweden the typical top rate of provincial and local income taxes is 31.7%, which means it exceeds the 25% income tax rate levied by central government. In some countries, state, regional or local income taxes paid constitute a deductible item, inasmuch as the amount paid in such taxes may be deducted when calculating taxable income for the central government income tax. For the presentation of 'all-in' tax rates in the graph, the deductibility of non-central government income taxes has been taken into account.

Bildhuset

Some insulation may come from taxes

Is it all tax?

Another feature to watch out for, particularly in Europe, is the tax some national governments impose on income on behalf of the state church. Austria, Germany, the Nordic countries and Switzerland all have such a church tax, though in the chart it is included only in the cases of Denmark and Switzerland. One may ask whether the church tax really is a 'tax' as defined by international organisations: a compulsory, unrequited payment to general government. Here, 'unrequited' means that benefits provided by government to taxpayers are not normally in proportion to their payments.

Likewise, it is sometimes difficult to define the status of social security contributions – are they really taxes or are they payments for some form of social protection? In part, the answer depends on the degree to which these payments are directly linked to the value of the benefits they offer. Social security programmes come in two basic forms. In some the revenue is earmarked to finance programmes that essentially cover the whole population. Here, the tax base may be identical to – or closely resemble – that for personal income tax. However, in contrast to the rate structure of the income tax, a ceiling or 'cap' often applies and income above that ceiling is not subject to further contributions.

In addition to programmes covering the whole population, most European countries run social insurance programmes which only protect workers, or at least sections of them. The tax base to finance such employee social insurances is wage income, usually up to a ceiling, which in turn is related to the maximum amount of wages in-

sured against the risks of unemployment and disability. Furthermore, in a few instances such payments can be made into individual accounts, such as pension plans, the relatively strong tie between contributions and benefits making them even less 'tax-like'.

Of course, when considering top marginal rates, social security contributions are only relevant if they are not capped. Contributions – where they are imposed – are usually deductible for personal income tax purposes, though this is not the case, for example, in Hungary, Norway and the United Kingdom. When calculating marginal 'all-in' rates, the OECD takes the deductibility of social security contributions into account.

Since the income tax and social contributions are quite similar in terms of the tax base they use and of their economic impacts, both are included in the calculations underlying the chart which compares the 'standard' top rate of central government personal income tax with 'all-in' top rates. These include the combined effect of temporary increases of the central government income tax, income taxes at local, regional and state levels, the church tax and employee social security contributions. Not included here are social security contributions directly paid by employers, even though these may eventually be borne by labour through tighter wage deals. Conversely, when labour is much in demand, employees may be able to shift part of their income taxes and employee contributions back onto employers by successfully demanding additional wage increases. That said, this article only considers statutory rates of taxes, which the law requires employees to pay.

Rate schedules of central government personal income tax

single person, no dependants, January 1998[a]

Country	Tax relief as proportion of APW[b]	Lowest standard rate	Number of tax brackets	Highest standard rate	Starting point (times APW wage)[c]
Australia	0.15	20	4	47	1.4
Austria	0.03	10	5	50	2.3
Belgium	0.19	25.75	7	56.65	2.2
Canada	0.03	17.51	4	31.3	1.8
Czech Rep.	0.23	15	5	40	5.9
Denmark	0.12	8	3	29	1.1
Finland	0.33	6	6	38	2.2
France	0.20	10.5	6	54	2.2
Germany	0.21	formula	4	53	2.1
Greece	0.03	5	4	40	2.5
Hungary	0.09	20	6	42	2.0
Iceland	0.18	29.31	2	34.31	1.8
Ireland	0.20	26	2	48	0.7
Italy	0.02[d]	19	5	46	3.5
Japan	0.09	10	5	50	7
Korea	0.07	10	4	30	5.5
Luxembourg	0.25	6	17	46	2.4
Mexico	0.08[d]	3	8	35	7.5
Netherlands	0.14	8.85	3	60	1.9
New Zealand	0.00	15	3	33	1
Norway	0.13	18.8	3	32.5	1.1
Poland	0.03	19	3	40	4.7
Portugal	0.03	15	4	40	4.5
Spain	0.21	17	8	47.6	4.6
Sweden	1.10	25	1	25	1.1
Switzerland	0.20	0.77	10	11.5	10.4
Turkey	0.13	25	7	55	28.5
United Kingdom	0.24	20	3	40	1.8
United States	0.24	15	5	39.6	9.7

APW: average production worker
a. Deductions or allowances related to specific income sources are not included.
b. Countries in colour apply tax credits; all others apply personal exemptions or zero rate bands. These systems are not directly comparable (see box).
c. Indicates salary level at which the highest income tax rate begins to apply; for example, in Australia, the highest rate starts at 1.4 times the APW wage.
d. The tax credit is a decreasing function of personal income. This percentage considers the level of the tax credit which corresponds to the APW income.

Source: OECD

Closer than you think

So where does our analysis of 'all-in' tax rates lead? One lesson is that the gaps at the margin between top income earners domiciled in various OECD countries are narrower than often imagined and certainly not as wide as the headline rates show. In fact, the marginal top rate in most countries rises substantially when considering the all-in rate of taxes on income, to 61% in France and Turkey, 62% in Denmark and Sweden, 65% in Japan and 66% in Belgium. The highest all-in rates for taxpayers in the United States fall in the 40–48% range, depending on the State where they are resident. That puts the gap with their counterparts in Sweden, which most people would see as the quintessential welfare state, in some cases at as low as nine percentage points. But before European countries gain too much confidence from this, US income earners can point out that taxpayers in Sweden and most other OECD countries in Europe move into top rate brackets at much lower income levels than they do. ■

There is more on taxation on page 60. In the next *Observer*, No. 217, we look at how top rates can vary within the same country. The surprising point to note there is that when it comes to the margin it is often not the rich who – on one additional unit of income – are exposed to the highest tax rates.

The core of the matter

So what is 'biotechnology'? A quick look at the word suggests a technology that is based upon biology, the study of living things, and this is reflected in the definition which first appeared in the 1982 OECD publication *Biotechnology: International Trends and Perspectives* and which is still accepted today: 'the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services'. [1]

The definition is broad, and like some of the others found in the pages of this Spotlight, could be interpreted to encompass growing, tending and caring of animals and plants used for food. It could also be interpreted to mean using microbes for processing foods such as yoghurt, cheese or beer; or using microbes to produce health products and drugs, such as antibiotics. The definition is also broad enough to encapsulate the use of microbes and plants for improving industrial processes and for cleaning up chemical spills. Today biotechnology is widely taken to mean genetic engineering, although some experts prefer to call this 'modern' biotechnology, seeing it as a sub-discipline.

Apart from defining biotechnology, the same 1982 *International Trends and Perspectives* report contained a number of recommendations. One of them states that for the public to have confidence in the products of modern biotechnology, governments must have proper mechanisms in place to regulate their safety.

From assessment to practice

Since 1980 OECD member countries have worked together on many biotechnology projects, including the publication in 1986 of *Recombinant DNA: Safety Considerations*. Also known as the 'Blue Book', this important work dealt with that specific biotechnology of 'genetic engineering', also called genetic modification. Genetic engineering is scientifically applied to living organisms that are used, or whose products are used, across the various industrial and agro-foods sectors. Some, for instance genetically modified bacteria producing human insulin for treatment of diabetes, and human growth hormone, were already approved in 1986.

The importance of biotechnology and microbiology in industry is gaining recognition every day (see Salomon Wald's article, p. 32). However, it is not so much these industrial applications, but rather the use of genetically modified organisms (GMOs) in food crops and their possible environmental effects which are increasingly raised as an issue of intense public and political debate today.

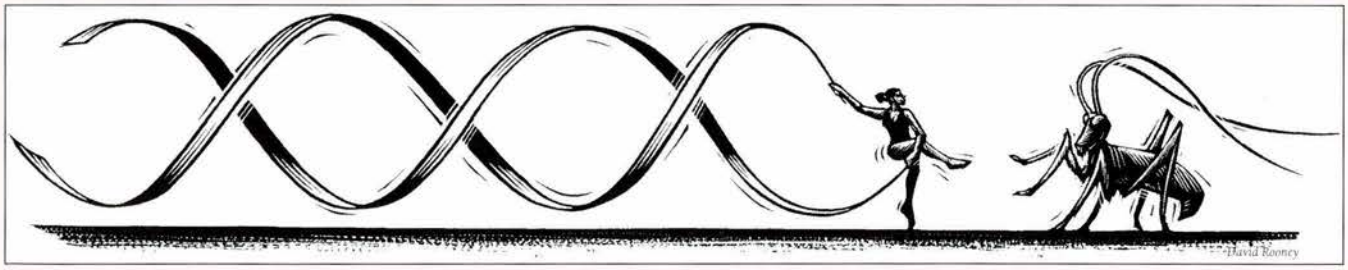
The 1986 Blue Book, the first OECD publication to respond to the 1982 recommendation for safe regulation, put forward key safety concepts for development and commercialisation of GMOs, including genetically modified plants for agricultural use. They covered advice on risk assessment; agriculture and the environment; and how to build our understanding of the behaviour of the GM plant.

These principles, for example, on safe small-scale field testing of GM plants, were developed by hundreds of experts from OECD countries and they have been used as the basis of Member country GMO regulation.

While all this was going on, private and public research institutions were already beginning to use genetic engineering to develop crop plant varieties with novel traits for farmers and the food processing industry. The first field test was conducted in Belgium in 1986,

> A tomato could be harvested ripe and shipped and sold to consumers before it went too soft and rotten

and since then many thousands have taken place all over the world. The first commercial approval in 1992 was in the United States. It was for a genetically engineered tomato that could be



harvested ripe, rather than green on the vine, and could still be packaged, shipped and sold before it went too soft and rotten. Since then a number of genetically modified crop plants have been approved for commercialisation, mostly in North America and Latin America, where they are now grown extensively.

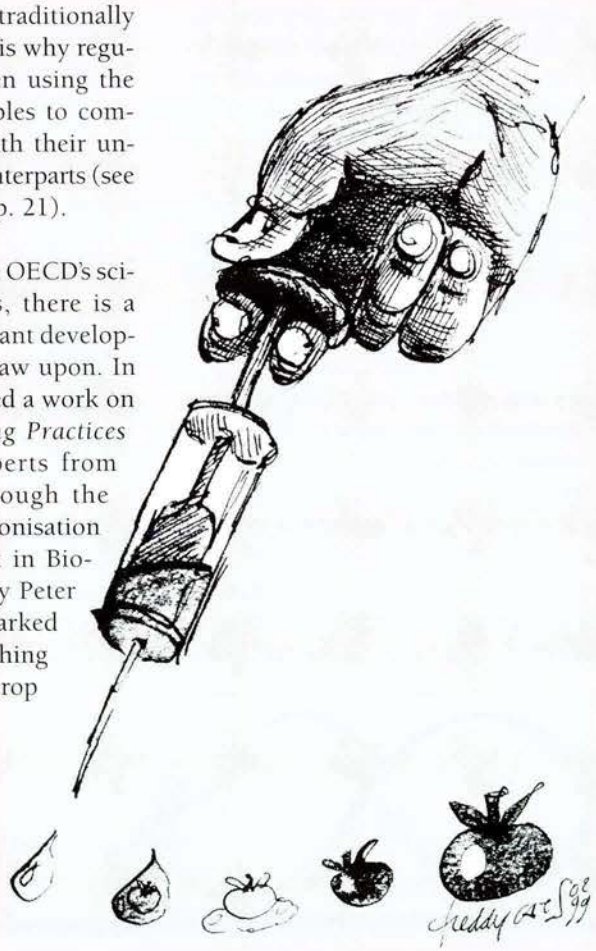
Understanding GMOs

Whether the cultivation of GMO crop plants endangers the environment or contributes to its safety is a matter of growing public debate. There are questions being asked about chemical fertiliser use and the possible effects of GM crops on bird, animal and wildflower species. Regulating for the safety of new food crops requires a good understanding of the environmental behaviour of the traditionally developed varieties.That is why regulatory agencies have been using the OECD's biosafety principles to compare the GMO plants with their unmodified 'traditional' counterparts (see article by Mark Cantley, p. 21).

Fortunately, thanks to the OECD's science-based case studies, there is a lengthy history of crop plant development and breeding to draw upon. In 1993 the OECD published a work on *Traditional Crop Breeding Practices* and more recently experts from Member countries, through the Working Group on Harmonisation of Regulatory Oversight in Biotechnology (see article by Peter Kearns, p. 24), have embarked on developing and publishing on a number of specific crop plant and tree species.

How new is novel food?

Most of the genetically modified crop plants commercialised to date have new attributes (novel traits) for the farming sector. That is why they are often refered to as new foods. Novel herbicide tolerance and pest and disease resistance are the major ones, yet in reality they are not new to crop plant varieties. Plant breeders have for decades been searching among crop species and their relatives and selecting genes that incorporate such traits into new crop varieties. What is new is the higher level of precision in genetic modification, thanks to the improved technologies available today. Furthermore, the market place has become extremely demanding. Growers everywhere have long demanded greater consistency from plant breeders. So have food processing companies, retailers and indeed final consumers themselves. All have been seeking consistent uniformity and quality in their food. GM food was one response to these calls.



What also makes novel food different is regulation. The trigger for biosafety regulation is clearly process-defined. Genetically engineered plants are regulated whereas their traditionally developed counterparts are not. Some interested parties see this as a contradiction and warn against over-regulation which would unfairly undermine the development of the GM food industry. Others insist that we are dealing with new processes which need to be better understood, so it is perfectly normal to apply as many specific risk and safety assessments as necessary to achieve public confidence. These are important differences of opinion which a balanced, objective, review would help to overcome. ■

*1. **Biotechnology: International Trends and Perspectives**, Alan Bull, Geoffrey Holt and Malcom Lilly, OECD 1982.*

How big is biotech?

Biotechnology is a fairly broad term and it is difficult to talk of it as a specific sector or industry. Still, Ernst & Young make a pretty good stab at measuring it. In their biotechnology report (*European Life Sciences*, 1998) they sometimes call it the entrepreneurial life sciences sector and in their analysis include those companies which use modern biotechnological techniques to develop products or services for health care, animal health, agriculture, food processing, renewable resources and the environment. Companies which use conventional biological processes, such as brewers, are not included, nor are non-profit research institutions. According to Ernst & Young, there were 1,036 companies working in the 'life sciences sector' in Europe in 1997, employing

Biotech in perspective

$ million

	1996	1997	% change
Europe			
Financial			
Revenues	1,952	3,090	58
R&D expense	1,710	2,166	27
Industry			
No. of companies	1,036	716	45
Employees	39,045	27,500	42
United States			
Financial			
Revenues	15,212	18,129	19
R&D expense	8,231	9,377	14
Industry			
No. of companies	1,274	1,287	-1
Employees	140,000	118,000	19

Quoted in Ecu in source. Converted to US dollars using IFS 1997 average exchange rate of $1.1341:Ecu1.

Source: Ernst & Young, 1998

more than 39,000 people directly, with revenues of $3.1 billion and $2.2 billion invested in R&D.

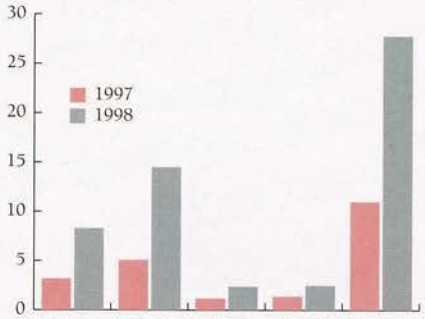
The US industry is much larger than Europe's. Again according to Ernst & Young US companies invested $9.4 billion in R&D in 1997, employed 140,000 people and posted total revenues of $18 billion. The spending is much higher, largely because the commitment to R&D in US operations is so high.

As for Canada, by 1996 it had proportionally more companies in biotechnology as defined by Ernst & Young than in either the United States or Europe and, in absolute terms, more companies involved in agro-foods.

A growing culture

The use of modern biotechnology, in particular genetic engineering, is probably the biggest emerging issue affecting food safety and quality, as well as international trade. The increase in area covered by GM crop plants is growing, as the graph shows. The total area of major, genetically modified crops was estimated at 28 million hectares in 1998, more than double the level of 1997. That is roughly equivalent to the agricultural land area of France.

Total area of genetically modified crops[1]
million hectares



1. United States, Argentina, Canada, Australia, Mexico, Spain, France, South Africa.
Source: C. James, Global Review of Commercialised Transgenic Crops: 1998, *ISAAA Briefs, No. 8, 1998.*

Attitudes towards genetically modified crops vary widely. North Americans appear relatively open towards GM food. In Europe the picture is more mixed; genetically modified organisms are heavily restricted by the European Union and banned in Austria and Luxembourg. In Switzerland a referendum rejected a move to ban the use of GMOs in June 1998. ■

Some definitions

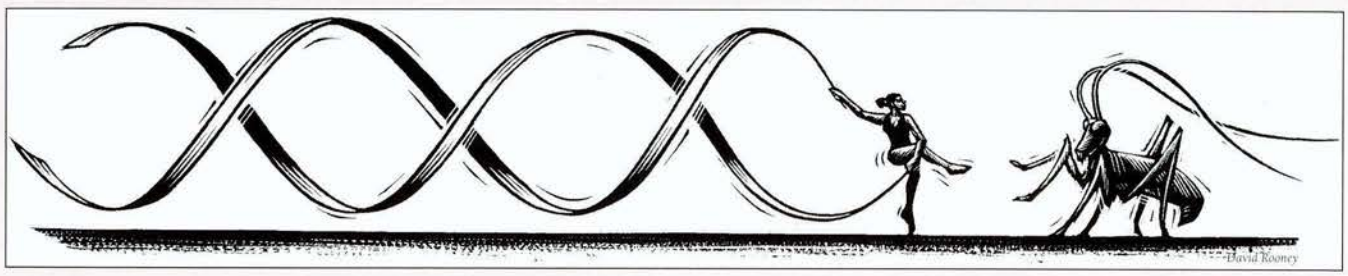
There are many definitions of biotechnology and most of them have been argued about, agreed on, deconstructed, reconstructed and indeed manipulated over the years. Here are a few from the 1980s which, like the one the OECD offers at the start of this Spotlight (p. 17), appear to have withstood the tamperings of time.

• 'Biotechnology' means the application of science and engineering in the direct or indirect use of living organisms or parts or products of living organisms in their natural or modified forms – Canadian Environmental Protection Act, 1985.

• The science of the production processes based on the action of microorganisms and their active components, and of production processes involving the use of cells and tissues from higher organisms – A Dutch Perspective, 1981[1]

• The collection of industrial processes that involve the use of biological systems. The use of living organisms or their components in industrial processes – OTA Report 1981.[1] ■

*1. **Biotechnology: International Trends and Perspectives**, Alan Bull, Geoffrey Holt and Malcom Lilly, 1982.*



Biotechnology at the OECD

Since 1980 the OECD has been a leading player in addressing biotechnology-related issues. During that time, modern biotechnology has evolved from a scientific curiosity towards commercial applications, and has reached the in-trays of more and more policy advisers, in different ministries or government agencies – science, industry, agriculture, health, environment, education, development, trade, patent office and others. It became impossible for any one agency to pretend to a monopoly on it. At OECD biotechnology also reached the agenda of committees and subsidiary bodies, to such a point that in 1993 an Internal Co-ordination Group for Biotechnology was established to facilitate co-operation between the various programmes. So how do these various parts of the whole work?

For science and technology policy, the main objective of the OECD's Working Party on Biotechnology is to provide support to the policies of member countries, particularly in the areas of public health, sustainable industrial development and bio-resource centres, such as culture collections, databanks and bioinformatics. The Working Party is also undertaking a major project on biotechnology for sustainable development which will provide guidance to industry and government on implementing new bioprocess technologies.

On the environment, a Working Group on Harmonisation of Regulatory Oversight in Biotechnology was established in 1993. Building on the earlier concepts of safety assessment, this group addressed in detail the safety assessment issues associated with a range of cultivated crop plants and micro-organisms, selecting first those plants or traits most commonly the object of transformation by modern biotechnology. The Working Group developed a standard pattern of activity, to produce over twenty 'consensus documents', on a standard model, and by a uniform procedure. A country with particular interest or experience volunteers to act as 'lead country' on a particular topic and the draft gradually develops through circulation and amendment. UN agencies – UNIDO and UNEP – participate, and when a document addresses a plant species whose wild relatives

> No one agency can pretend to a monopoly on biotechnology

are indigenous to a particular region, experts in the countries concerned are consulted. Thus consensus documents are built through a science-based international dialogue, focusing on such matters as the biology of the organism and the nature of the transformation.

As to agriculture, the OECD Schemes for Seed Certification were developed to regulate international trade in seed. Their main purpose is to harmonise the assessment and certification of identity and purity of cultivated crop varieties – including genetically modified ones. Another important agricultural project at OECD is a Co-operative Research Programme, which provides post-doctoral fellowships for young scientists to work in a foreign laboratory. It also organises scientific workshops covering a number of topics which include work on biotechnology (see article on dialogue, p. 31).

Finally, as part of OECD's work on trade, a synthesis of national submissions on intellectual property rights in biotechnology has been developed and the results of this work were published in February 1999.

GM food, regulation and consumer trust

MARK CANTLEY[1], SCIENCE ADVISER TO THE EUROPEAN COMMISSION
YOSHINOBU MIYAMURA, JAPAN BIOINDUSTRY ASSOCIATION

Most whole food has never been the object of specific regulation, but that is changing with the emergence of genetically modified produce. So what should be the trigger for regulating such products? And what practical tools can we use to ensure the safety of novel foods?

Slowly but inevitably, the surge in understanding and precision tools that have illuminated the life sciences in recent years are transforming the two pivotal industries whose very essence is life: food and health. Downstream from the laboratory, agriculture and the health-care industries have seen their performances heightened and their competitiveness improved, often generating better value and quality for the consumer. The health and food sectors are both in ferment, as they try to absorb the flood of new knowledge and data that comes with the advances of biotechnology.

However, these advances have also underlined some key differences between the two. Health care is a highly regulated sector whose products address often life-threatening situations in a context where risks and benefits must be balanced; a context which imposes ethical imperatives on the medical practitioner, the drug industry and the regulatory authority to be fully up-to-date with the latest knowledge. To fail to keep up with developments would be culpable negligence.

1. Former secretary of the ICGB at the OECD.

The food sector also deals with biological phenomena – the growth of plants and animals, their protection against infection and disease, the transformation and distribution of resulting products, safeguarding these against microbial or other contamination, fine tuning their taste, quality, and acceptability to the consumer, studying nutritional and other effects.

> As creatures of habit the latest innovations are not necessarily what we want

The new knowledge and techniques are no less available to the food industry, and genome projects on the main agro-food plants and animals are ongoing.

But thereafter several differences start to emerge. Food is familiar, and comforting in its familiarity: we need to eat every day, and because we are creatures of habit the latest innovations are not necessarily what we want. Furthermore, most of what we eat has never been the object of specific regulation. Innovation may raise suspicions, which regulation may intensify rather than placate. Thus in the public mind, novelty in food is a more sensitive issue than advances in health care.

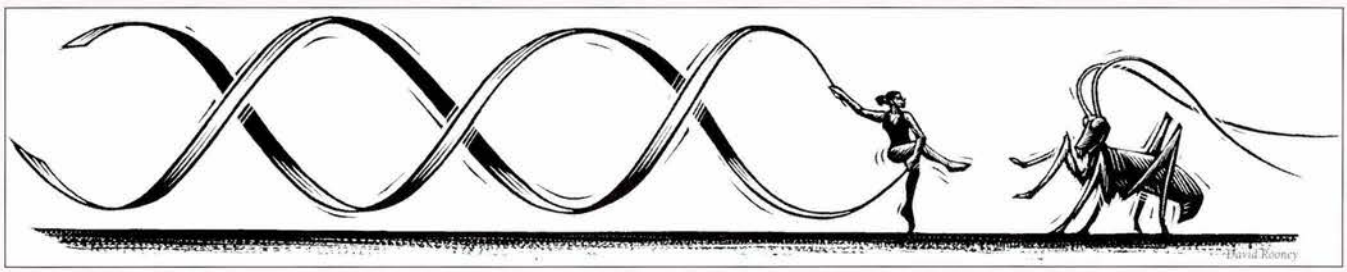
PhotonicaH Bjornson

How to fill it?

For two decades the OECD has been addressing these problems and contradictions, clarifying the issues and encouraging the international sharing of experience and diffusion of best practices. And from its work, some regulatory developments have followed.

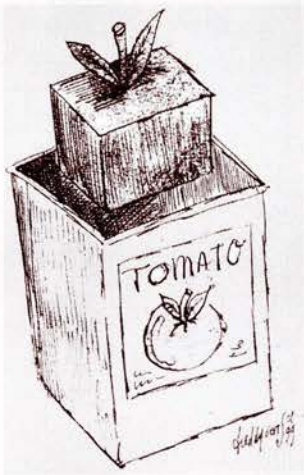
Expertise, ideas and familiarity

A basic conclusion of the early years is that the methods of assessment traditionally used in bio-safety matters remain relevant. Enormous experience has accumulated in sectors such as the production and testing of drugs and vaccines, worker safety, food safety, plant breeding, pesticides, agricultural quarantine. Safety assessment should build on existing knowledge of the



David Rooney

Substantial equivalence



By 1993 an OECD expert group – building on the earlier work of the 1980s – had developed and published a key concept: for foods and food components from organisms developed by the application of modern biotechnology, the most practical approach to the determination of safety is to consider whether they are *substantially equivalent* to any conventional food products, if such exist. To establish this, the knowledge of the composition and characteristics of the traditional parent product or organism and the characteristics of the new component and product were needed.

Principles for the application of substantial equivalence to the assessment of the safety of GM foods:

- If the new or modified food or food component is determined to be substantially equivalent to an existing food, then further safety or nutritional concerns are expected to be insignificant;
- Such foods, once substantial equivalence has been established, are treated in the same way as their analogous conventional counterparts;
- Where new foods or classes of new foods or food components are less well known, the concept of substantial equivalence is more difficult to apply; such new foods or food components are evaluated taking into account the experience gained in the evaluations of similar materials (for example, whole foods or food components such as proteins, fats or carbohydrates);
- Where a product is determined not to be substantially equivalent, the identified differences should be the object of further evaluations;
- Where there is no basis for comparison of a new food or food component, that is, where no counterpart or similar materials have been previously consumed as food, then the new food or food component should be evaluated on the basis of its own composition and properties.

organism to which changes have been made, providing clear information about the changes introduced and the intended use. One significant criterion is familiarity with the organism – whether within the industrial fermentation tank, the farmer's field or in food consumption habits, a long history of safe use is a reassuring and practical starting point. Thus the initial focus on the new technology of recombinant DNA and the genetic modification of organisms shifted by the end of the 1980s to focus on the organisms themselves, the specific changes, and the intended use. The responsibility for safety assessment lay with the various agencies concerned, dealing with such matters as live vaccines, gene therapy, environmental impacts of agricultural crop plants and food safety.

The regulatory trigger

Regulatory oversight, or safety assessment, in the food sector had long focused on such matters as residues, contaminants, processing aids, packaging materials, labelling – everything, in short, except the main elements of the food itself. The various plant, animal and other products by which we and our ancestors have met our needs for carbohydrate, fats, proteins and vitamins had generally been overlooked.

Only as modern or novel technologies, such as food irradiation or the use of explicitly identified enzyme additives, became available, did public interest and regulatory attention begin focusing on the main food elements themselves and the technological processes to which they have been subjected. This poses a fundamental and central question: given that we have not regulated the bulk of the foodstuffs we eat, raw or processed – many of which have entered human diet only in recent years – by what rationale should we start regulating the latest innovations in products or processing methods? What should be the trigger for new regulation?

This question has strong implications, not least for international trade, and for the provisions of international instruments such as the Agreement on Sanitary and Phytosanitary Measures under the World Trade Organization (see article by Wayne Jones *et al.*, pp. 27–31).

To help solve these problems, the principle of substantial equivalence for assessing the safety of novel foods,

including those derived through modern biotechnology, has become current practice in many countries. In the context of the European Union it has acquired legislative force, being incorporated into the text of the Novel Foods and Novel Food Ingredients Regulation (NF&NFIR), adopted in 1997. This Regulation, which is binding on all EU member states, is significant in several respects, and has been at the centre of some of the recent controversies over the applications of modern biotechnology in the food chain.

A term with its difficulties

Its implementation has raised criticism because, in focusing specifically on the characteristics and the safety of products, it does not necessarily consider the technology through which the product has been derived. Nor does it oblige the producer or vendor to provide specific information to the consumer about the technologies used. Public concerns about genetically modified food and demands for information led the European Commission in 1997 to adopt a directive requiring specific labelling of products containing or produced from genetically modified organisms (GMOs) which are notified for placing on the market. Foods or food ingredients containing or produced from GMOs fall under the NF&NFIR; they would not require specific labelling if found to be substantially equivalent to conventional foods. This has led to considerable dispute within Europe about the precise meaning of substantial equivalence.

Scientists and suppliers have argued that legislation should limit itself to the safety issues and question the rationale of including or omitting any particular technologies used in the production chain from such obligations.

On the other hand, where there is public anxiety there is policy priority, and this is evident in debates currently going on in some European countries. Before the GMO question emerged, consumer trust in food safety had already been shaken by mad cow disease and there was widespread public dissatisfaction with how that crisis was handled by the regulatory authorities. Such delicate situations underline the absolute importance of international dialogue at expert level, to clarify matters and reduce the scope for misunderstandings and narrow, albeit crucial, differences. The OECD has become a valuable forum for that purpose.

Substantial equivalence cannot always be readily established. Several different perspectives on the operational problems with regard to new foods and processes emerged at a workshop held at Aussois, France, in March 1997. For example, it was stressed that comparisons should be made with closely related lines, ideally the parent, grown under the same conditions. The point was made that environmental factors can influence the plant phenotype – identical seeds grown in different circumstances producing differing plants, perhaps even in their nutritional characteristics – and that comparing data from several different locations would be useful (see next article).

Asking the right questions

From the political context come questions which define the agenda – what shall we regulate, why, and how? It is vitally important to ask whether the aims of regulation are to protect public safety, to respond to public concerns, or to maintain public confidence in the safety of foods on sale. Although closely related, each of these formulations is quite different, a fact which has become as clear as it is troublesome in the context of regulating GM foods.

The regulatory issues associated with the diffusion of crop products and processed foods derived through modern biotechnology have intensified. The OECD offers a well-structured environment for building greater mutual understanding and pragmatic consensus, with its mixture of perspectives and experiences in government, agriculture, environmental protection and consumer safety. Clear principles are needed now more than ever. Substantial equivalence is one useful tool which can help us to build those principles. ■

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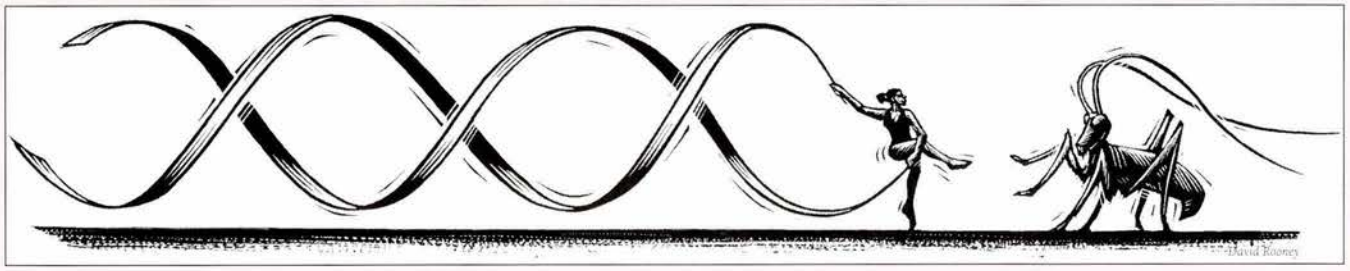


What is harmonisation of regulatory oversight?

PETER KEARNS, ENVIRONMENT DIRECTORATE, ENV.CONTACT@OECD.ORG

Modern biotechnology is changing fast and is beginning to have a major impact on agriculture and the environment. Increasing the efficiency of safety assessment and promoting transparency in the exchange of information are among the key aims of the OECD.

The 1990s have seen a rapid increase in the development of genetically modified products, many of which are destined for release into the environment. So far, most of the products being developed consist of major crops, such as maize, wheat and soya bean. Well over 40 types of crop plant species have been genetically modified to exhibit a variety of traits, including resistance to various insect pests and disease and tolerance to certain herbicides. Through modern biotechnology quality characteristics have improved, reducing spoilage.

The majority of OECD member countries have developed – or are in the process of developing – their own systems to assess the environmental and health safety of these new varieties. In some countries, the system is inscribed in a specific law regulating the use of biotechnology products. In others, the regulation might be a part of legislation, for example, on environmental protection. A few countries have preferred a more voluntary approach to control.

There are country differences in terms of who controls what. In some it is the job of the health ministry to ensure safety assessment, while in others that job goes to agriculture or environment ministries. Sometimes, it is a shared responsibility among ministries or agencies. Where there is similarity between approach it is the underlying technical information which regulatory authorities use to assess safety.

Three aspects of GMOs

Typically, three aspects of a genetically modified product are examined: the biological characteristics of the crop species under consideration; the spe-

BioTrack data entries
Field trial by country

Other includes in descending order: United Kingdom, Italy, Netherlands, Spain, Japan, Germany Australia, Sweden, New Zealand, Denmark, Brazil, South Africa, Finland, Portugal, Russia, Bulgaria, Austria, Switzerland

BioTrack chart includes country records of field trials of genetically modified organisms which have taken place in OECD member countries and other countries provided through UNIDO's BINAS.
Source: OECD

A biotech knowledge e-world

The difficulty with information on biotechnology safety assessment is that by its very nature it evolves quickly and has to be transmitted fast. That is why the OECD set up BioTrack Online which is the web site of the Harmonisation of Regulatory Oversight in Biotechnology. It was created in 1995 and includes a database of biotechnology products which have been commercialised, together with a database of field trials. It also includes the consensus documents as well as information on laws, regulations and the lists of responible authorities in each country. BioTrack helps government, industry and the public everywhere to keep up with biotechnology developments, notifications and assessments.

BioTrack Online

- Regulatory Developments in OECD member countries
  http://www.oecd.org/eh/country.htm
  Member country pages and their biotechnology agencies
- Database of Field Trials
  http://www.olis.oecd.org/biotrack.nsf
  Includes records of field trials of genetically modified organisms which have taken place in OECD countries
- BIOBIN
  http://www.oecd.org/ehs/biobin/
  A joint OECD – UNIDO page
- OECD's Internal Co-ordination Group for Biotechnology
  http://www.oecd.org/ehs/icgb
  Biotechnology-related work in different OECD directorates
- Biodiversity at OECD
  http://www.oecd.org/ehs/icgb/biodiv.htm
  Provides information about OECD activities related to biological diversity

cific trait introduced through the modification – for disease resistance, for instance – and third, the potential impact on human health and the environment. Of these three aspects, the first two – the information on the biology of the crop species and the characteristics of the introduced trait – are generally the same from country to country. And it is here that much of the OECD's work on harmonisation is focused.

The main aim is to facilitate the development of consensus documents by its member countries. These documents focus on information either on the biology of a specific crop plant species or on introduced novel traits. They include technical information which is relevant to the safety assessment of biotechnology products and are intended to be mutually acceptable among OECD countries.

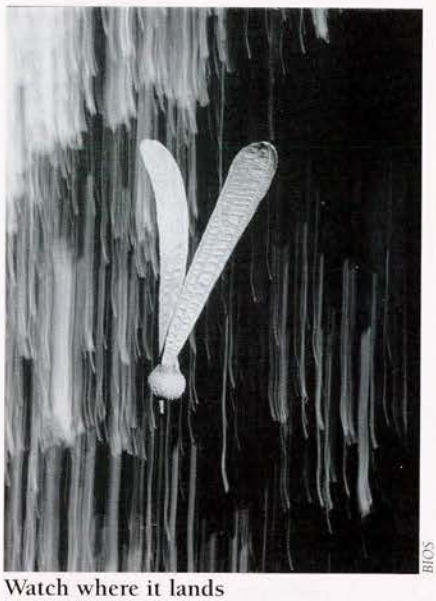
Through its Working Group on Harmonisation of Regulatory Oversight in Biotechnology, the OECD collates scientific evidence that is useful for environmental safety assessment, but it makes no overall judgement as to the environmental safety of these plants or genetic engineering processes. This is because all GM plants are evaluated on a case by case basis, helped by field trials. A key part of the evaluation is to consider the environment into which the plant is introduced.

What risk?

One example is the environmental safety assessment of a genetically modified variety of oilseed rape (*Brassica napus*). The task there is to understand the possibility for the development of hybrids between the cultivated variety and its wild relatives. The question asked is whether such hybrids might lead to the introgression of novel traits into the related wild species. If so, the related species risk becoming weedy and more invasive of other natural ecosystems. This possibility is especially important for the locations where the species originally evolved, their so-called centres of origin.

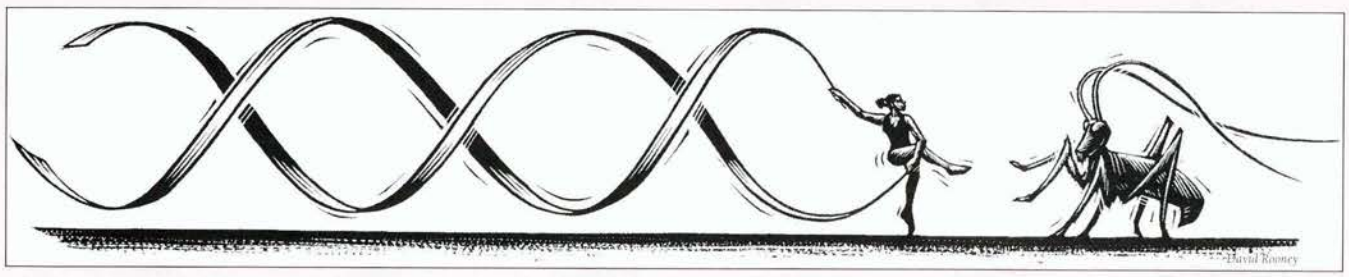
The OECD's consensus document on oilseed rape reports on the ability of cultivated varieties of oilseed rape to 'hybridise' with wild relatives. However, because there is a wide variation in the distribution of wild relatives around the world – and the potential environmental impact can differ from one place to another – the actual safety assessment itself remains the responsibility of the national authorities themselves to carry out.

One major advantage of the OECD's collective approach to compiling safety information is that it avoids duplication in assessment, which means significant savings for the regulatory authorities involved. Literally thousands of genetically modified crop varieties are currently being tested (or have been tested) in small-scale field trials, before they are grown at a commercial scale. Normally, each of these trials requires a separate safety notification in each country and these field tests have already represented over 100 different combinations of plants and traits. Government and industry see savings in approval procedures too. It is a gradual, though reliable, process. And based on it, a number of GM plant varieties have been approved for commercial growing by regulatory agencies in the United States, Argentina (a non-OECD country), Canada, Australia and Japan. However, very few have been approved and grown in Europe.


BIOS

Watch where it lands

Whatever line different countries take on biotechnology, the value of harmonisation of regulatory oversight will remain the same. It provides a common baseline and an evolving set of references to help form policy judgements about the environment in the fast changing world of modern biotechnology. ■


David Rooney

A public perspective

JULIE HILL, TASK GROUP ON PUBLIC PERCEPTIONS OF BIOTECHNOLOGY[1]

The issue of GMOs in food and their possible effects on the environment have featured highly in the European media since the start of the year. The OECD *Observer* invited Julie Hill to explain the reasons behind this upsurge in concern.

Q: Is there a problem with GMOs?

A: It's very difficult to say, though that's part of the problem. We really are dealing with something novel here – the ability to move genes from species to species, sometimes in ways that would never be possible with 'traditional' plant breeding techniques. That means that as consumers of food, and in the environment, we are being faced with combinations of genes that we have not encountered before. We can of course test these new products in various ways – analyse their toxicity or allergenicity to humans, monitor their growth and behaviour in controlled conditions before releasing them to the wider environment – but we do not have any hard and fast ways of predicting the long-term consequences of altering nature to the degree that genetic manipulation allows. Green Alliance accepts that the likelihood of a problem from any one product is small, but is concerned that an accumulation of subtle effects might affect the environment and health in a way that will be difficult to deal with.

Q: What do you think might go wrong in the environment?

A: The term 'superweed' is often used to express the concern that introduced genes will 'jump' from crop plants to wild relatives of the crop, and that the new genes will make the resulting hybrids more vigorous and weedy than either of their parents. This is a possibility, although it is important to bear in mind that not all crops grown in Europe have wild relatives with which they can interbreed. For instance oilseed rape does, wheat and maize do not. Also, any undesirable effects will be very slow to emerge – probably decades. A more likely and immediate kind of environmental impact could be from the crop/chemical packages enabled by genetic manipulation - herbicide tolerant crops, for instance, would allow more widespread use of certain weedkillers. The environmental impact of this could be positive, if it obviates the use of more persistant and toxic chemicals. But it could be negative if it means that there are even fewer weeds in fields, and thus less food for insects, small mammals, and in turn, birds. So Green Alliance has always argued for a broad 'environmental audit' of GM crops, rather than the narrowly-focussed risk assessments currently undertaken under European regulations.

Q: Do you accept that there might be environmental benefits from GMOs?

A: Yes, but we need to see the data. If the companies developing genetic technology want their claims to be taken seriously, their analyses of potential benefits must be as rigorous as those required by the regulatory system for risks. It would also help to have their data, on both risks and benefits, independently evaluated.

Q: Why do the citizens of Europe appear more concerned about GMO food and crops than their US counterparts?

A: It is hard to say for definite, but I can suggest some factors. The US regulatory agencies seem to be more open and more trusted. In Europe, the BSE crisis has undermined popular trust in the competence and motivation of scientific advisers and their political masters. On the environmental side, the United States has a clearer separation of agriculture and conservation areas, or 'wilderness', and both are vast. In the more crowded countries of Europe, what is left of the environment and wildlife is inextricably tied up with agriculture, so trends in agriculture matter. As one UK government advisory agency put it, we want to ensure that GM crops are not 'the last straw' for wildlife already under pressure from intensive agriculture. A further small point – most of Europe has ratified the convention on Biological Diversity – the United States has not.

Q: What should organisations such as the OECD do next?

A: OECD countries should accept that there are legitimate public health and environmental concerns arising from GMOs. They should support the principle of a comprehensive environmental audit for GM crops – perhaps by putting their own experts on the case. Maybe OECD countries ought to place less emphasis on harmonising their different regulatory approaches and accept that some countries might want the flexibility to impose particular measures to ensure the protection of their environment.

Julie Hill is a member of the European Federation of Biotechnology's Task Group on Public Perceptions of Biotechnology. She is also programme adviser to Green Alliance, an independent, UK-based non-governmental organisation whose mission is to put the environment at the heart of policy-making. Ms. Hill has been on a UK government advisory committee on releases of GMOs – ACRE – for the past nine years. Green Alliance is not opposed to GM technology, but it wants to ensure that the environmental risks are properly assessed, that there is greater transparency in the regulatory system and that the public participates in decision-making.

Food safety: protection or protectionism?

WAYNE JONES, FOOD, AGRICULTURE AND FISHERIES DIRECTORATE
JEAN-CHRISTOPHE BUREAU AND STÉPHAN MARETTE, FRENCH INSTITUTE FOR AGRICULTURAL RESEARCH

Consumers want their governments to pay closer attention to food safety and quality. That may mean more regulation, which if ill-defined or excessive can damage trade and well-being. Weighing up the costs and benefits of particular regulations, rather than just assessing risk, could help improve safety, while avoiding protectionism.

Consumers are generally much less tolerant about health risks from food than about risks from tobacco or cars. Smokers probably accept the risks they run from cigarettes, but eating food, particularly fresh food, is not supposed to be a risky venture, particularly in today's modern, hygiene conscious world. But consumer confidence in the food industry has been badly shaken by scares caused by mad cow disease and outbreaks of food-borne poisoning, such as from E Coli 0157 and listeria. There have been steep drops in demand for certain products as a result of these scares, and serious economic hardship has been the lot of some in the sectors concerned.

There is no absence of rules

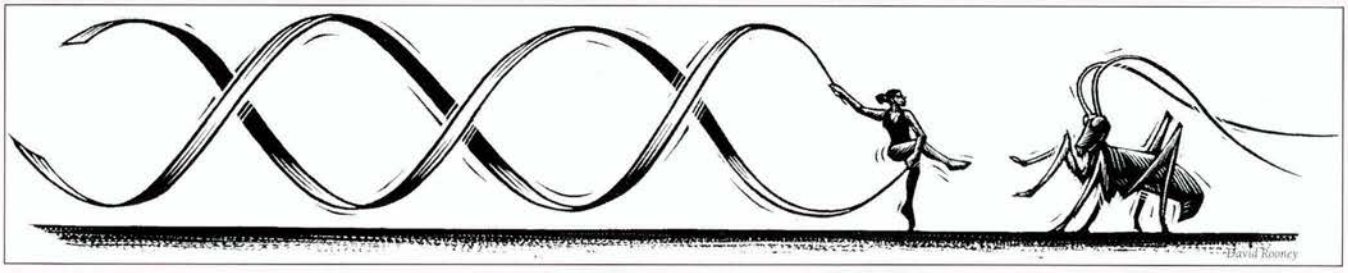
In fact, consumer concerns go well beyond basic food safety. The quality of food and how it is produced, animal welfare, the use of genetically modified organisms (GMOs), hormones, the environment and ethical and cultural differences all feature highly in the public debate. Governments have understandably come under intense pressure to ensure safe food at a minimum cost to consumers and industry. The trouble is that the complexity of the issues makes the right policy response difficult to identify, especially in the awkward cases where public opinion is strong and where convincing scientific evidence is in short supply.

Nevertheless, governments are responding. Canada, France and New Zealand have established new food agencies with broad mandates for health, safety and inspection responsibilities. A similar agency has been proposed in the United Kingdom. The United States has announced a new initiative to address the health risks of food consumption involving several federal agencies with related responsibilities and the authority of the US Department of Agriculture in this area has been enhanced. The EU has legislated for the labelling of GMO products (see article by Mark Cantley, pp. 21–23). Furthermore, the Parliamentary Assembly of the Council of Europe, an organisation which brings together some 40 European countries, has recommended a framework convention on food safety, setting up food safety agencies at the national and European level, strengthening legislation, improving health checks and increasing access to information.

> Attitudes vary: making cheese from unpasteurised milk is acceptable in France, Italy and Switzerland, but is banned in some countries.

The difficulty is that consumer attitudes to risk and government approaches to food safety and quality vary significantly from country to country. Making cheese from unpasteurised milk is perfectly acceptable in France, Italy and Switzerland, but is banned in some countries.

National regulations on pesticides differ widely. Food safety and quality control systems have different specifi-



cations and may not be recognised by trading partners. Irradiation is used on some foods, such as spices, onions, and only in some countries, such as Belgium, but is not used in others. Such differences in approach can inevitably bubble up into disputes between trading partners.

There are few quantitative estimates of the impact of national regulations on trade or well-being and where such estimates exist they are always debatable. Nevertheless, the US Department of Agriculture has recently identified some 300 cases where national regulations harmed US food exports and put the impact at as much as $5 billion annually in lost sales.[1] It is clear that as traditional barriers to trade, such as tariffs, come down, regulations have become more numerous and sophisticated. Standards and procedures can help exporters, because they provide concrete and tranparent rules which facilitate trade. But they can also reduce international competition, distort markets and prevent firms, notably foreign firms, from entering the market.

Trade disputes over food regulation could become more common in the years ahead.

New animal welfare rules, such as the banning of battery farming of veal calves, which have been established in several OECD countries, make it possible to prohibit the import of non-compliant goods. There is therefore a danger that with strengthening of international rules, the globalisation of the food industry, increased competition in consumer food products and the growing use of biotechnology, trade disputes over food regulation will become more common in the years ahead.

As part of the 1994 Uruguay Round Agreement, the Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) agreements were forged to guard against regulatory protectionism, while encouraging the use of international standards (see box). The major exporting and importing countries are observing their obligations, with over 700 SPS measures notified by some 52 WTO countries, while many low and middle income countries have yet to notify a single measure.

Despite the resolution of several SPS related conflicts through the WTO trade dispute settlement procedure, the agreements have not solved all the problems. India, for example, argues

1. D. Roberts and K. Deremer, Overview of Foreign Technical Barriers to US Agricultural Exports, *Commercial Agriculture Division, Staff Paper AGES-9705, Economic Research Service, US Department of Agriculture, Washington, D.C., 1997.*

International standards

The implementation of the Uruguay Round, in particular the SPS and TBT agreements, has provided significant momentum towards the use of international standards in food safety and quality. It gives greater importance to international bodies, especially the *Codex Alimentarius Commission*, which sets standards for human health protection and which is one of the main organisations to be consulted by the World Trade Organization in matters of trade disputes involving safety standards and practices.

The *Sanitary and Phytosanitary Agreement (SPS)* recognises the right of governments to restrict trade in order to protect human, animal or plant health. However, such measures must be transparent, consistent and based on international standards or scientific risk assessment. There must be equal treatment for all nations and between imports and domestic products. The SPS Agreement also encourages mutual recognition of national regulations (equivalence principle). With respect to food, it covers health risks (food safety) arising from additives, contaminants, toxins and pathogens contained in food products.

The *Technical Barriers to Trade Agreement (TBT)* is much broader, covering all technical regulations, voluntary standards, conformity assessment procedures and any other measures not covered by the SPS Agreement. It seeks to ensure that national measures are transparent, have a legitimate purpose and minimise restrictions on trade. Compliance with relevant international standards is encouraged. In terms of food, the TBT agreement covers packaging, composition and labelling as well as quality requirements.

that the sanitary measures imposed by some of the richer countries and by the SPS agreement are unfair because the regulations block exports to North America and Europe. Similarly, some countries protested that the precautionary measures taken by the European Union and the United States against mad cow disease were an overreaction that restricted imports, and were particularly felt by regions untouched by the virus.

Vintage cases

Some countries, particularly in Europe, use technical restrictions on production methods in the name of authenticity or in order to safeguard traditional products. The restrictions can create obstacles for their exporters and can put domestic producers at a competitive disadvantage, by preventing them from adopting innovative techniques for example. Another problem concerns intellectual property rights to a region's traditional products (see article by Evdokia Moïsé, page 29). Wine appellations are a well-known example of this and they continue to be a bone of contention between the European Union and the United States.

Disputes when they happen can last a long time. The disagreement between the European Union and the United States over the use of growth hormones in cattle has been going on for ten years. The EU's refusal to authorise the use of such substances has the effect of limiting imports from third countries where their use is allowed. The dispute was settled on appeal in 1998, and the EU has undertaken to comply with the recommendations by May 1999.

Implementation is difficult

The actual implementation of international standards also holds difficulties of its own. The SPS agreement explicitly requires science-based risk analysis to be carried out if a country adopts measures which differ from, and perhaps fall below, international standards. However, there is no agreement on what constitutes acceptable risk and there are ongoing debates over how to calculate it. The SPS agreement (Article 5.7) allows the adoption of provisional measures where relevant scientific evidence is insufficient, but this 'precautionary principle' is too restrictive for some consumer groups.

New production methods, driven by technology have added to consumer unease, fuelled by a growing mistrust of science and its interpretation in terms of food regulation. It has become essential for governments to consider all potential risks to the safety and wholesomeness of food, at all stages of the food chain.

> Ignoring the legitimate values of consumers could result in a falling away of support for trade liberalisation in general

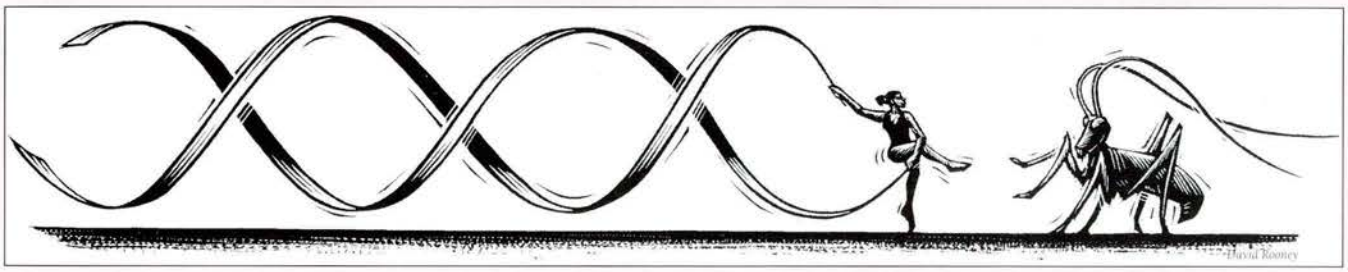
Antoine Devouard/REA

Trust me

A country may introduce more stringent regulations on cultural, moral or religious grounds only under very limited conditions and only under the TBT agreement, where they may be taken into consideration by authorising different labelling. The question of values can be delicate.

Is food just a matter of taste?

Ignoring the legitimate values of different consumer groups could result in strongly negative reactions in the market and a falling away of their support for trade liberalisation in general. However, giving too much consideration to ethical arguments could likewise provide justification for a whole host of trade barriers, as concerns are



David Rooney

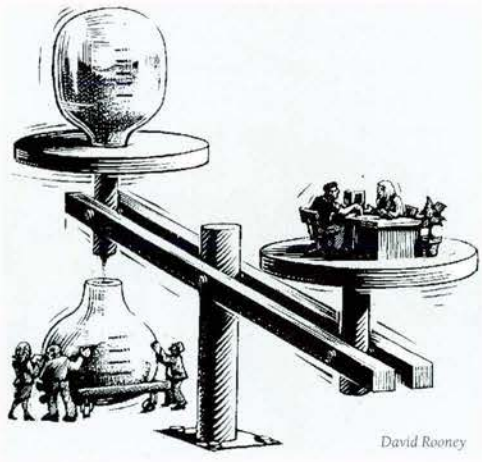
Weigh up the costs and the benefits

When it comes to assessing regulation and safety with regard to particular goods, cost-benefit analysis does not receive the emphasis it should, particularly when compared with the importance of pure risk analysis. The Uruguay Round agreements (see p. 28) give economic assessment only a limited role in the settlement of sanitary and technical disputes. In fact, there is no requirement in the SPS agreement that the economic benefits of any regulatory measures must outweigh the costs. Yet it is becoming clear that some regulatory measures can have net economic drawbacks. To use the terminology of cost-benefit analysis, they have a negative effect on society's welfare – or well-being – even if the measures reduce risk.

It would be paradoxical if international standards resulted in more trade but a lower level of well-being. Good regulatory practice requires that any regulation be assessed for the benefits it offers, and the costs it imposes. Many countries introduce import restrictions on sanitary grounds, such as to avoid the spread of pests, without making any prior estimate of potential losses, which may be very small in comparison with the cost the regulation imposes on industry and consumers. If cost-benefit analysis were used more often, the welfare gains resulting from the regulations could be compared with the welfare gains resulting from freer trade, for example.

In other words, cost-benefit analysis can help public authorities to take better decisions about their national regulations. One study recommends that the method should be used systematically, since very considerable differences were observed between the cost of public health measures and their real impact on health.[1] For example, the cost per life saved varied between $200,000 and $10,000,000 depending on the programme, which means that more lives could be saved at the same cost to society. Even though society does not accept all risks in the same way, and even though social choices cannot be reduced to comparing the cost of different programmes, cost-benefit analysis is an important stage in the framing of regulations. In fact, it is mandatory for projects of a certain size in the healthcare sector in the United States (Executive Order 12291, 1981).

It would be paradoxical if international standards resulted in more trade but a lower level of well-being



David Rooney

Methods based on estimates of the cost of illness or the cost of shortened human life may also be used to assess the benefit of regulations. These costs can then be compared with those of sanitary regulations. In practice, this raises many technical and methodological problems. For example, estimates of cancer risk from pesticide residues contain a substantial degree of uncertainty, making any economic estimate particularly difficult. In addition, it is not possible to calculate risk where there is too much uncertainty, making it difficult to carry out analysis with conventional tools. This is the case with the risk of genetically modified organisms propagating genes, or the risk of long-term epidemics, such as any associated with mad cow disease.

Measuring the benefits procured by regulations designed to guarantee certain ethical or cultural aspects of product quality is no easy matter either. Nor is the valuation of imagined risk. However, it may be possible to measure a situation where consumers place particular value on the fact that a good is produced without the use of biotechnology or irradiation, for example, and then estimate their willingness to pay. That would be a good way of showing in money terms how consumer satisfaction would respond to regulations prohibiting the techniques.

W. J.

1. K. J. Arrow, M. L. Cropper, et al., *'Is there a Role for Benefit-Cost Analysis in Environmental, Health and Safety Regulation?'* in Science, *No. 272, 1996, pp. 221-222.*

exploited by pressure groups acting in their own interests.

Present arrangements for taking economic costs and benefits into consideration in the settlement of disputes relating to technical and sanitary barriers are unclear. The argument, that a measure can be defended if the welfare costs of abolishing the regulation exceed those of keeping it, is just about admissible under the TBT agreement, but barely, if at all, under the SPS agreement. There are objections to the use of cost-benefit analysis on both philosophical and pragmatic grounds. For a start, how can the notion of benefit be defined, especially when it comes to something as personal as food?

Clearly no overall rule is feasible. Surely regulators should let themselves be guided more by a thorough economic analysis and, as in the implementation of competition policy, allow decisions to be taken on a case-by-case basis, while ensuring that society's well-being is fully taken into account. ■

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Improving the international dialogue

Apart from work at the OECD, discussions on the GMO question have been undertaken within the *Codex Alimentarius* commission, the International Organisation for Epizootics (OIE), APEC's Experts Group on Agricultural Technical Co-operation (ATC), the UN Environment Programme (UNEP) and the negotiations of the UN Biosafety Protocol. The hope is that regulatory reform and harmonisation will address the problem of market access, increase consumer confidence in the safety and efficacy of GMOs and reduce the risk of serious trade disputes.

A recent OECD Workshop on *Emerging Trade Issues in Agriculture* attracted over 180 participants from academia, international organisations, government, consumer, environment and industry NGOs, and agri-business, in addition to delegates from all member countries. The main purpose was to help identify the best ways in which the OECD could provide the analytical support to the process of multilateral trade liberalisation. All the documentation can be accessed on a special website (http://www.oecd.org/agr/trade/).

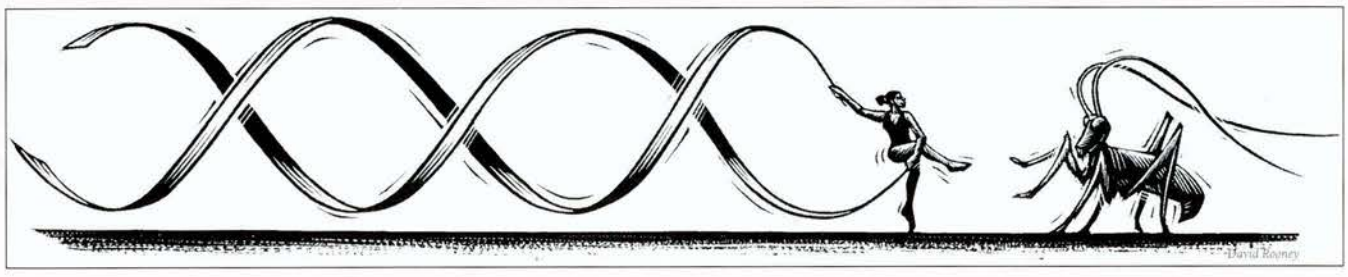
One of the most lively sessions was on food safety and quality, in large part because of its impact on agriculture and trade. Several research needs were identified, including:

- the role of economic impact assessment (cost-benefit analysis) in domestic regulatory assessment and in the development of international protocols or agreements regulating international trade

- regulatory mechanisms governing agricultural biotechnology in member countries with implications for harmonisation, mutual recognition and for international trade

- domestic approaches to emerging social concerns and consumer preferences and the implications for international trade

- the potential and limits of labelling in facilitating international trade in food products



Biotechnology and industry: a union of promise

SALOMON WALD, SCIENCE, TECHNOLOGY AND INDUSTRY DIRECTORATE

To many, biotechnology is all about genetically modified foods and cloning. Yet, it is also proving its value to the industrial production process, offering clear environmental and economic advantages over conventional methods.

In an industrial context, 'clean' is a relative term. Any change that reduces consumption of raw materials and energy or reduces waste, including recycling, is 'cleaner' or more environmentally friendly. There are ways of evaluating technologies and their alternatives in terms of their relative cleanliness throughout the production process and the life of the product. More generally, with industrial biotechnology the focus has shifted from remediation to prevention of environmental degradation.

A cleaner alternative

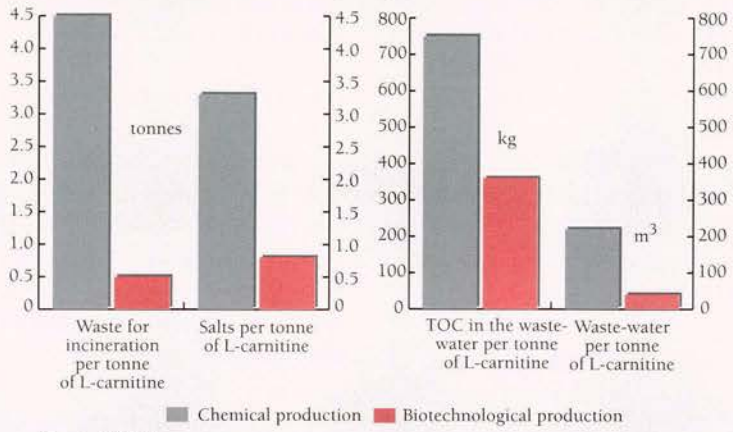
Biotechnology-based manufacturing can in fact be significantly 'cleaner' than the alternatives. The chemistry of living organisms is rather more efficient than that of chemical processes, and the wastes generated tend to be recyclable and biodegradable. In the galvanising industry, for example, replacing an alkaline process by a biotechnological process reduces the amount of hydroxide sludge created as waste by half and requires only one-tenth of the water. In the fine chemicals industry, the production of cephalosporin, an antibiotic, through a biotechnological rather than a chemical process results in a considerable reduction in the cost of measures to protect the environment.

Waste and resource consumption are being reduced using various biotechnological methods. And costs have been cut as well. Treating wood pulp with funghi (biopulping) rather than thermomechanically, for example, results in an overall energy savings of

Alex Bartel/Science Photo Library/Cosmos

How clean can it get?

Waste treatment example:
chemical vs. biotechnological productions of L-carnitine



Source: LONZA

up to 30%, and using enzymes (biocatalysts) to break down wood cellulose can result in faster processing with considerable savings of water and energy. While scientists are now searching for more reliable biocatalysts that will work at higher temperatures in the petrochemical industry, for example, such biocatalysts will still operate at temperatures below their conventional equivalents.

Integrating biotechnology in industry

Biotechnological processes have improved and can now compete with other technologies. They are being widely used in the chemicals industry (especially for fine chemicals and pharmaceuticals), pulp and paper production, textiles and leather, food processing (including animal feed), metals and minerals, and energy sectors. In developed countries, these sectors account for between 30% and 50% of all manufacturing. Biotechnological processes have helped them to improve their rather poor environmental image and, in many cases, increase their efficiency.

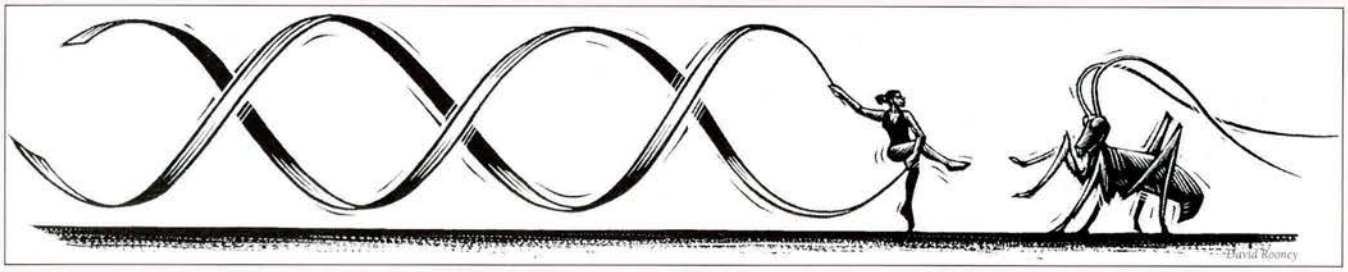
One exciting prospect is the possibility that bioethanol, a liquid transportation fuel produced from agricultural waste, may one day meet a large share of global demand for petrol. Unlike conventional fuels, bioethanol is not a net contributor to greenhouse gases. It is not yet cost-competitive, but that should change. At the US National Renewable Energy Laboratory, it is hoped to produce ethanol from biomass by 2000 at a cost that will be competitive with petrol.

> Biotechnological processes can be incorporated into existing plant without the need for radical overhaul

Biotechnology has numerous applications. At one end of the spectrum, it helps improve large-scale fermentation based on living organisms, such as ethanol. At the other end, minute parts of biological molecules are used as sensors in analytical devices, for example to detect viruses. Moreover, its power as a tool for industry is increasing rapidly. Novel enzymes, or biocatalysts, recombinant organisms and extremophiles – organisms that live under extreme conditions of pressure or temperature, in deep-sea vents or geysers – have the potential to make industry cleaner and more efficient.

In addition to its contributions to industrial processes, biotechnology has also led to the creation of a wide range of materials, such as biodegradable plastics, biopolymers and biopesticides, novel fibres and even timbers. Some are used as fabric softeners, corrosion inhibitors, ink carriers, solvents, hair conditioners and perfumes. The waste from these manufactured products can decompose more naturally.

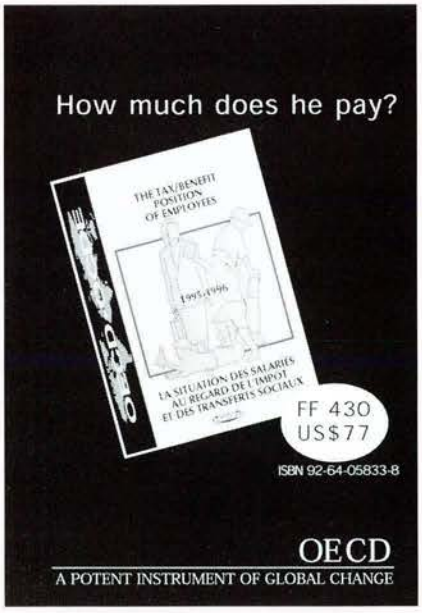
With all these benefits it may seem remarkable that industrial biotechnology is not more widely used. Industrialists have long been concerned that biotechnological processes might be less effective, the costs and risks too high, the scale of operations too restricted. These concerns are no longer



valid. But bottlenecks and challenges remain nonetheless.

First, there are still scientific and technological hurdles. Novel processes require capital expenditure and development costs can be high. But on the other hand, biotechnological processes can be easily incorporated into existing plants and equipment, without the need for radical redesign or overhaul. And many of the technical problems are being overcome through new designs for bioreactors.

Research continues into recombinant DNA technology, bioprocess engineering, the development of new bioreactors and the search for novel organisms living in extreme conditions. There is a huge and as yet untapped wealth of unknown microorganisms that may be a source of valuable biocatalysts. Proteins and enzymes with novel functions and properties can be obtained by improving known natural ones, for example through directed evolution, in which enzymes are engineered for use in specific applications.



A second reason why biotechnology has not permeated industry more quickly is simply that the training of engineers and industrial designers does not tend to cover the relevant biological processes. The nature of the materials, the vessels and the operating conditions of biotechnologies are so different that engineers and plant operators have to be retrained, and the instinct has been to stick with familiar processes.

A co-ordinated effort

Public opinion is a potent force on environmental issues and managing it presents a key challenge. Lead-free petrol and recycling have been widely introduced, in the main spurred by public pressure. Lifestyles have changed and the demand for cleaner products has risen. Policy decision-making has followed and so has business behaviour. It is now quite common for companies to see environmental public relations as a key part of their business strategy, whether by advertising on television or inviting consumer groups to participate in shaping decisions.

But public trust cannot be secured by information campaigns alone. Explaining biotechnology, in particular its regulatory aspects, is also important to avoid confusion and calm unfounded fears. Education is therefore essential. The public might not want to know the technical details, in which case the aim should be to bolster public confidence in the use of industrial biotechnology to show that it is a rigorously controlled field, backed up by accountable public agencies. That means transparency and openness to debate.

Governments too have to encourage the use of industrial biotechnologies. Legislation, the quality of regulation, clarity of government guidelines, standards, procurement policy and government-supported R&D – all these can encourage or discourage, accelerate or delay progress.

Governments cannot work in isolation. And they too must keep up with the speed of innovation. That is why joint action with industry is so important, to improve R&D, for example. Scientists also have to communicate with government, industry and the public to explain the significance of their projects.

The international dimension to policies for clean technology draws its strength from international agreements and conventions. The 1992 Rio conference on the environment and its Agenda 21 were milestones, because governments acknowledged that a balance must be struck between globalisation and sustainable development.

Cleaner industry may be a relative notion, but one thing is clear: the urgent task of emissions reduction does not have to mean economic loss. Indeed, with biotechnology the environment and the economy can actually reinforce each other. Getting that message across is vital. It would not only improve industrial sustainability, it would help to ensure that the link between industry and pollution is broken once and for all. ■

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Intellectual property: rights and wrongs

EVDOKIA MÖISÉ, TRADE DIRECTORATE

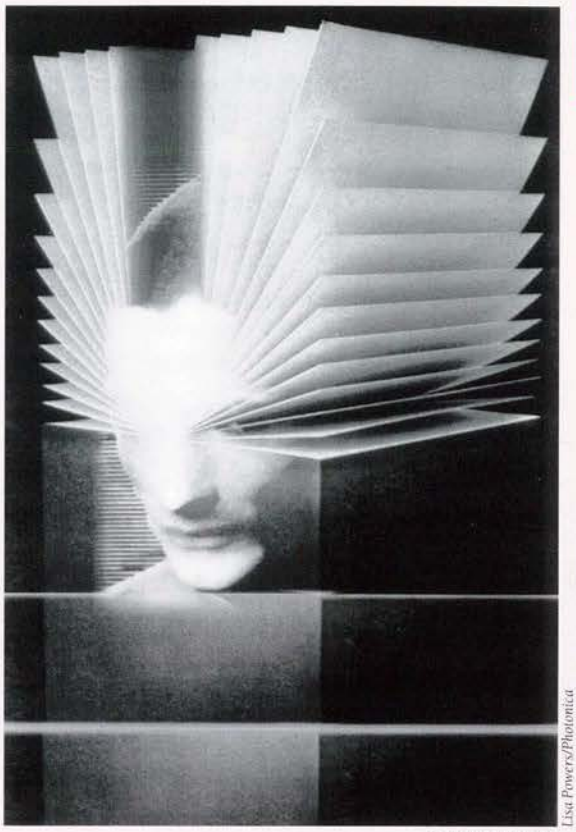
The intellectual capital invested in biotechnology raises important questions about protection. Some of them hold risks.

The market for biotechnology is expected to be worth $38 billion by the year 2005. That makes it a lucrative market. But it is much more than that. For whatever the controversies surrounding it – and one only needs to read the newspapers to know there are a few – biotechnology's influence over our lives is growing, whether it be in the way of the life-saving drugs it brings to the market or in food production with its claim of reduced reliance on chemical pesticides and higher, more reliable, yields. Public calls, particularly in Europe, for better information about the true effects of GMO food on health and the environment, have served to push the stakes for the concerned industries higher still.

Modern biotechnology aims to understand and exploit biological processes for practical ends. It would not exist without the knowledge that goes into it. On average, the biotechnology industry ploughs some 45% of its annual income into R&D. That means nearly half the value of the industry is embedded in its intellectual capital.

The trouble is that intellectual capital is a very plunderable good: it can be stolen quite easily, copied and then sold without authorisation. This sometimes happens in the pharmaceuticals industry, where drugs are imitated and marketed at cut prices, particularly in poorer countries.

Biotechnology companies have to feel that their heavy investment in knowledge is worth it, that they will hold the rights to their research findings and to profit from them. That is why patenting is seen as being important to researchers; it protects their new ideas and products and acts as an incentive for them to continue researching. Patenting also encourages them to be forthcoming with the results of their research. As long as patents are properly targeted and not too broad (see p. 38), they will continue to play an important role in stimulating innovation.



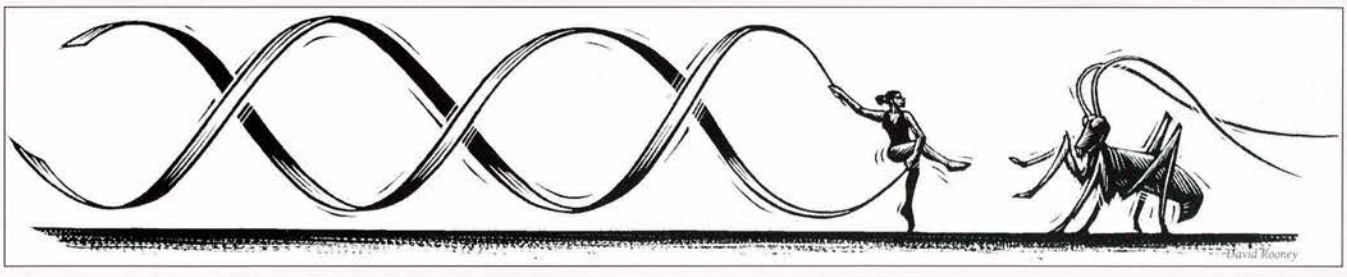
Lisa Powers/Photonica

Sorting it out

Innovation or discovery

Innovation in biotechnology germinated in universities and start-up companies. This was a fragile base, since these concerns did not have the financial muscle needed to market their own goods and ideas. To be able to license their innovations to large companies, such as Monsanto and Novartis, they turned to intellectual property protection where it was available.

But there lies the rub. For while there have recently been many breakthroughs in biotechnology, most of them were unimaginable at the time when the world's intellectual property protection systems were elaborated, mainly in the 1950s and 1960s. Now

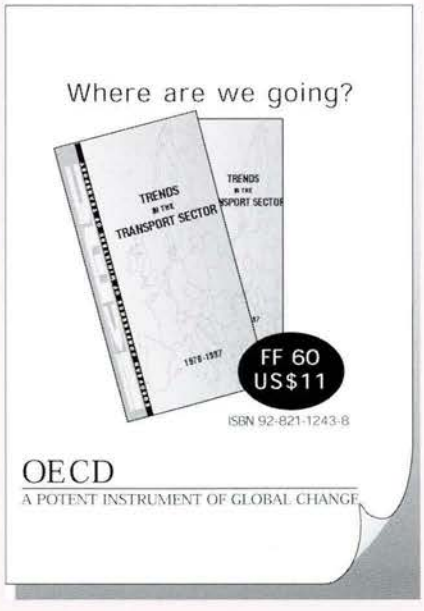


David Rooney

the interpretation and application of those rules to biotechnological innovation has become a major public challenge.

Key questions have had to be asked since the first applications for intellectual property protection of biotechnological inventions. Are we dealing with innovations in the strict sense, or just discoveries? And how can traditional patenting criteria be applied? Take the example of the growth hormone in humans. Identifying it was not an innovation in itself, since the hormone already existed and could be extracted. However, what could be patented was the synthesised version of the hormone, which was used in children to prevent dwarfism.

Little wonder that different intellectual property systems dealt with questions of innovation and discovery in different ways. That these differences would have implications for trade made for some heated discussion at the trade talks leading to the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), which was finally signed in 1994. In fact, those differences have not been resolved and policy-makers will have another go at them later this year.



Public disquiet is a policy challenge

The challenge facing legislators has not been made any easier by the public's unease about health and safety, in particular about genetically modified (GM) food. Moreover, scientific breakthroughs, like the cloning of sheep, have caused alarm and accusations that man is 'tampering with nature'. Getting the right balance in intellectual property protection with respect to biotechnology would probably help to restore some public confidence.

> Intellectual property rights are temporary rights of exclusive exploitation of an idea and not ownership rights to the product that emerges from it

One reason for the unease lies in the confusion between property rights in the material sense and intellectual 'property' rights, which are in fact temporary rights of exclusive exploitation of an idea and not ownership rights to the product that emerges from it. Patenting might give ownership rights to, for example, the genetically controlled process leading to a new life form, but in no way does the patent confer ownership rights on the life form itself. After all, if Dolly the sheep belonged to her masters after her birth, it was because of other laws and nothing to do with the patent.

In 1999 the OECD published a review of intellectual property practices of its member countries in the field of biotechnology. As the study shows, there are some common practices, but there are diverging ones as well, which may have to be dealt with if biotechnology is to be put on to a stronger footing.

The WTO TRIPs agreement provides intellectual property protection to product and process inventions as long as they satisfy three basic criteria: they are new, are inventive and have an industrial or other practical use. (It is important to note that having a patent does not mean authorisation for its commercial exploitation will be obtained.)

WTO member countries retain the right not to extend patents to inventions that raise ethical concerns or which pose risks to human, animal or plant life or to the environment. Inventions of diagnostic, therapeutic and surgical methods for the treatment of humans or animals may be denied patents, as might inventions of plants and animals other than micro-organisms and the biological processes producing them.

These exclusions reflect standing practice in Europe and follow to a large extent provisions in the European Patent Convention. They are at odds with the more pro-patent countries of Australia, Japan and the United States. The elaboration of those European patent provisions dates back to 1973 – some even go back to the 1963 Strasbourg Convention. Conveniently, they rather suit Europe's presently cautious attitude to GM food production.

Ethical divisions but common outcomes

The exclusion from patents of inventions on the basis of ethical considerations appeared at the moment of the adoption of the TRIPs agreement as one of the most important controversies dividing OECD countries. In Europe for instance, ethical interpretations based on general prescripts tend to drive patent decisions. In the

United States specific laws exist targeting specific practices; case by case ethical judgements are not the norm. True, ethical considerations may underpin a specific law, but once the law is in place it alone drives the patenting process.

The OECD survey demonstrates that ethics are used to justify exclusion in every country in OECD Europe, as well as in Japan, Korea and New Zealand. Only Australia, Canada and the United States do not recognise such general grounds for exclusion. But in practice so far the end result has been the same.

In those legal systems where it applies, exclusion on ethical grounds is understood to cover principally the use or cloning of human beings, or animal experimentation involving suffering to an extent that cannot be justified by the greater good of the invention. With respect to cloning there is no actual difference among OECD countries, since those countries which do not recognise ethical considerations as a ground for patent exclusion nevertheless refuse such patents through specific laws. Moreover, other laws and regulations tend to prevent animal suffering, even in countries where patents are possible. Clearly, practice regarding human cloning and animal experimentation is similar across OECD countries, what differs are the means used to regulate it.

But that is the situation now. Relying on ethics makes for an uncertain future for biotechnology. Ethical decisions to exclude patents could be made for short-term political gain, or simply for the sake of appeasing public opinion. There is always the danger of them being evoked as a veiled trade barrier. Meanwhile, European industry is concerned that ethical considerations could have the longer term effect of putting Europe at a competitive disadvantage by holding up research, into food production for instance.

But on the other hand, modern biotechnology is still in its infancy, and ethical-based systems may have the virtue of being open ended and adaptable to new circumstances as knowledge about particular processes, including GM foods, improves.

Plant cases expose shortcomings

The ethical debate will no doubt rage on, even if in practice the outcome across OECD countries remains the same. But there are divisions in practice regarding plants, with clear-cut effects on the development of agrofood output.

Patents for certain types of plants have been available under US law since 1930, but in most other countries patent law was originally considered unsuitable for protecting new plant varieties. This is mainly because it was not certain that a given plant could be reproduced by applying the same breeding methods each time. Cross-breeding, for example between two types of rose to produce a third type, was not a reliable enough process to merit a patent. Special national laws on plant breeder's rights were elaborated in some countries in the 1960s and an international agreement was concluded, called the International Union for the Protection of New Varieties of Plants (UPOV). However, with biotechnology breeding has become a more reliable process: the same engineering process is in every case expected to produce the exact same plant each time. By normal standards, it warrants a patent.

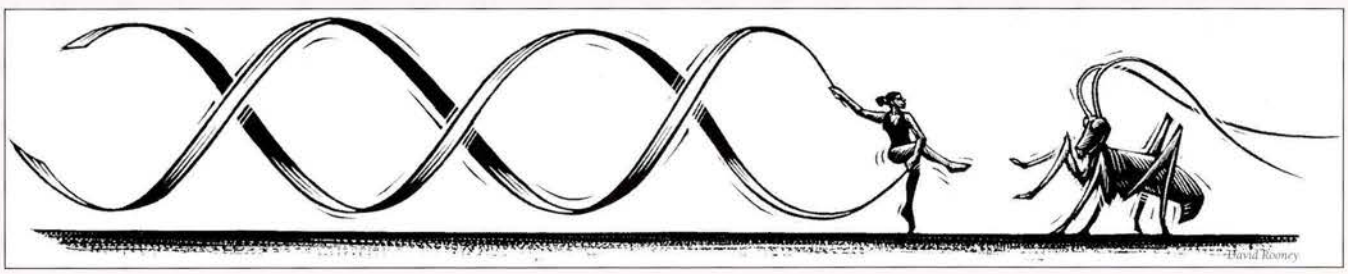
Plant-variety protection systems are restricted to the marketing of the reproductive material of the protected variety. They leave outside their scope farmers, who can save or sell seed they produced for future planting (the so-called 'farmer's privilege') and researchers, who can use – but not sell – protected seed to develop new varieties and commercialise them

Observers past

Ten years ago

Biotechnology is not an industrial or agricultural sector–it is a broad, generic technology. It is the third technological revolution this century, after nuclear energy and information technology. For hundreds of years its evolution was slow...the next ten years will see even more changes in a discipline intimately linked with man and life. These are early days.

Salomon Wald, March 1989



without paying royalties (the so-called 'breeder's privilege' or 'research exemption'). These exemptions were tightened up under the 1991 revision of UPOV, which is not yet in force. However, one effect may be to limit the access of farmers to agricultural material at the low prices they were used to, and this has annoyed developing countries in particular.

There lies another important challenge for international policy decision-makers to deal with: how to strike a balance between the demands of modern biotechnology and the imperatives of traditional farming in a world where the rules of intellectual property rights are getting ever tougher. ■

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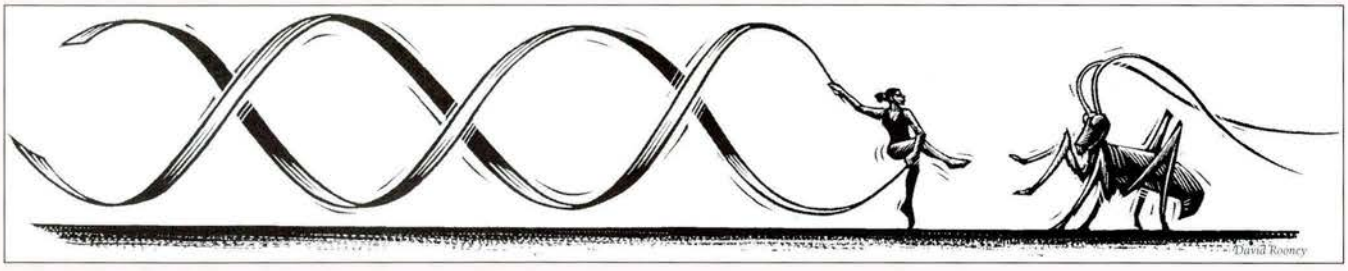
The Observer *would like to thank Simon Barber for his helpful comments and advice in the preparation of this Spotlight on biotechnology.*

Should broad patents give rights over future inventions?

It is not surprising that in such a novel technology field, several 'pioneer' inventions have been presented in the recent years. Patent offices have tended to provide these novel inventions broad protection. These patents cover protection of future, as yet unknown, uses, even though the patent was issued on the basis of the first therapeutic breakthrough. Let's take a hypothetical example. If a scientist secures a broad patent for a drug that lowers blood pressure and then someone else discovers that the same drug cures ear infections, the new inventor will not be able to patent the new use of the drug. He or she would have to pay out royalties to exploit the drug's new application. Another example would be new crops; a novel cotton which resists a specific pest might get an exclusive rights patent to all GM cotton, including those that have not yet even been invented. In other words, today's broad patentee has ownership over tomorrow's inventions. Although such broad protection might be fair recompense for pathbreaking discoveries, it could put a brake on future research. It could cause researchers to stop even key investigations into the GM product if the product in question was patented. It could also lead to seeking and collecting patents for the sole purpose of securing royalty rents over future inventions, rather than for the purpose of commercialising the actual product of the research. The end result of all this could be a concentration of key patents in a few hands and a new market distorsion which would undermine biotechnology at the root. It is a policy question of the utmost importance, one which depends on finding the right balance between keeping knowledge markets open while protecting ideas for the greater good.

E. M.



Road safety – who cares?

ANTHONY OCKWELL, SCIENCE, TECHNOLOGY AND INDUSTRY DIRECTORATE

Cars are getting safer, but are our roads? Probably not enough.

Christmas and New Year came and went with the usual merry vigour: shopping trips, parties and visits to friends and family. But the holiday season also brought another traumatic wave of death and serious injury on the roads. It is a world-wide problem and while there may have been a reduction in the number of fatalities in some countries – Australia and Mexico for example – others such as Spain saw a substantial rise. But even where there have been falls it cannot be said that injury and fatality on our roads have reached satisfactory or acceptably low levels. They have not. The World Bank estimates that road accidents could become the third cause of mortality by the year 2020 unless there is some radical new thinking about the problem and a fundamental change in attitude. So are current road safety strategies failing us or have tragedies on our roads become banal?

The figures make cheerless reading. Preliminary estimates of road deaths for the 1998–99 Christmas/New Year season show 46 in Australia, 132 in France, 301 in Mexico and 105 in Spain. Poignantly, celebrating the New Year accounts for a significant component of these statistics.

Unfortunately, road tragedies happen throughout the year. In 1996, some 130,000 people were killed in road crashes in OECD countries, with the 17–25 and the over 60s age groups most at risk. Up to 60% of total deaths occurred in rural areas. Ironically, vehicles have never been safer and dramatic improvements have been made in road user safety since the early 1970s when road deaths reached record levels.

The price of a pileup

Road crashes do not come cheaply either. In 1996 the total economic loss resulting from deaths and injuries amounted to $452.8 billion, which is a remarkable 2% of GDP in OECD countries. This cost is arrived at using what is called the human capital approach, which measures the loss in productive capacity of crash victims, with imputed labour market values used to estimate the output foregone. Insurance payments and amounts paid as compensation are used to evaluate property damage.

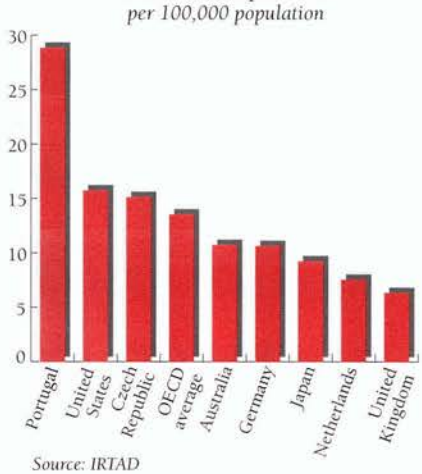
Another way of measuring the cost of road accidents is to look at how much people would be willing to pay for improving their road safety. This approach produces an even higher figure than the human capital approach, putting total economic loss at 4% of GDP in OECD countries, or $905.5 billion, again using 1996 as the case year.

Some companies have taken action, such as by training and providing incentives, to reduce the costs imposed on them through days lost and property damaged as a result of road crashes. And some companies have even seen their insurance premiums falling as a bonus.

Still, as a whole, further gains in road safety are proving hard to deliver in the face of increasing vehicle ownership and motorisation throughout the world. There is an argument that the gains in road safety of recent years achieved through compulsory seat belt wearing, random breath testing, improved speed management strategies and advances in vehicle occupant protection systems are close to being exhausted. But underlying this view is an apparent acceptance that road trauma is simply the price we pay for greater mobility and personal freedom, that road safety has indeed reached a satisfactory level.

That view is misguided. The extent of human suffering and economic waste on our roads is not inevitable. But like any challenge facing it, it is for society to decide what it is willing to trade in return for safer road transport. Clearly, all safety improvements involve some cost to society, whether it be stricter speed limits leading to higher policing costs or safer cars pumping up car prices. Road infrastructure improvements, enforcing ever lower levels of blood alcohol content and compulsory helmets for cyclists – these are all possible measures which might justifiably be interpreted as restraining freedom, although others would argue that such measures deliver freedom through security, as well as generating large savings. But whether they can deliver the improvements witnessed in individual OECD countries over the past 30 years (see chart below) is another matter. Still, comprehensive road safety strategies and continued research give some room for optimism.

Number of fatalities, 1996
selected comparisons
per 100,000 population



Source: IRTAD

Getting road safety programmes in line

Simply put, effective road safety programmes need a combination of three things: campaigns to raise public awareness of the risks associated with poor road-user behaviour, a stringent enforcement regime and a consistent penalty system. To those might be added vehicle design and construction requirements and a road infrastructure component.

Excessive speed and alcohol consumption are the two major causes of road accidents. New Australian research has shown that the risk of involvement in a crash in a 60km/h zone doubles for every 5km/h in excess of the speed limit (Kloeden et al, 1998). So speeding at 10km/h over a 60km/h speed limit results in a fourfold increase in the risk. The 60km/h legal speed limit can be likened to driving with a Blood

Easy solutions

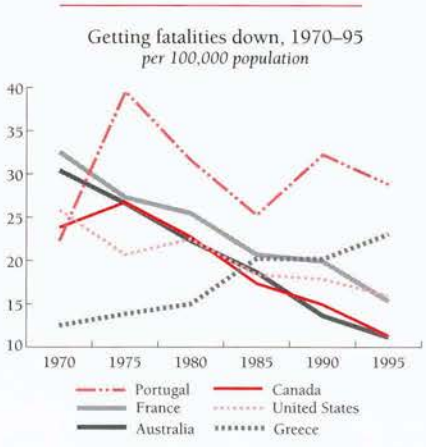
Since its launch in 1967, the OECD Programme of Research on Road Transport and Intermodal Linkages (RTR) has been looking at how to improve road safety. RTR work now underway is focused on 'best practice' in road safety policy, particularly dealing with the main causes of road crashes. RTR is also addressing the safety needs of older people, while the problems in non-OECD countries are also under scrutiny.

RTR's recent findings on the rural road safety problem highlighted the need for more co-ordination between agencies responsible for rural road safety. Police enforcement was found to be particularly important. Thankfully, improving road safety is not all about expensive design and information campaigns. In fact, RTR has found that remarkably simple steps would greatly reduce the number of rural road crashes, such as removing roadside obstacles and other clutter from country lanes and generally helping to create a more user-friendly road environment.

Alcohol Content (BAC) below 0.02 g/100mL. Driving at 65km/h is calculated as being similar to the risk of having a BAC exceeding 0.05 g/100mL. By extenstion, the level of risk doubles when the BAC is increased from 0.05 g/100mL to 0.08.

This raises the question about what society regards as an 'acceptable' level of BAC for driving. Some countries, such as Sweden, have taken a tough line, adopting levels of 0.02 or less, and there are signs that the trend is moving in that direction. Another question is about penalties and fines, which should be in line with the gravity of the act but not to the extent that they cause confusion. Widely divergent penalty regimes exist for similar offences in OECD countries; speeding or drink-driving can lead to a stiff fine and a suspended licence in some jurisdictions, to a light fine in others. Also, penalty regimes can generate mixed signals to road users in that one form of behaviour, drinking for example, is less acceptable than speeding, even though their risks are similar.

Road safety campaigners have to convince the public that speeding is as socially unacceptable as drink-driving. Indeed, by focusing on these two areas alone, a reduction of up to 20% in the level of road fatalities over the next 10–15 years might be achievable (Makeham and Brooks 1998, Vulcan 1998).




Fourmy/REA

Enough is enough

There are other areas to look at too. Pedestrians represent about 20% of road deaths and there are indications that that proportion may be rising. Many of them are elderly and specific policies to protect this group would be useful, such as adjusting pedestrian crossings to suit their needs.

Improving vehicle and road design is clearly important to forcing down the level of road trauma. Promising innovations include new technologies to detect impaired driver performance from fatigue, advanced cruise control and braking systems and even crash avoidance systems. But there are more banal contradictions which might be resolved. For example, there is a view that aerodynamic car fronts, while saving energy emissions and costs, may be more unfriendly to pedestrians because of the lower point of impact. That means what drives car design may have to be rethought a little too.

All of these improvements entail some adjustment costs and probably some regulation as well. But that seems to be a price worth paying for better road safety. The savings to business, governments and society generally would more than compensate. That makes it a sound investment, with happier New Year journeys and many happy returns. ■

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The continuing saga of labour market segregation

FRANÇOISE CORÉ, DIRECTORATE FOR EDUCATION, EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS

In OECD countries, women's employment is not necessarily synonymous with high wages and career opportunities. The labour market remains difficult for women and in all fields of activity, it will be a long time before women have equal access to the same occupations as men.

In modern societies, one might easily get the impression that the problem of gender inequality in the labour market is a thing of the past. But this is far from true, as an examination of employment indicators in OECD countries shows. The fact is that women do not have the same opportunities as men on the labour market, either in terms of wages or career prospects. Female employment still remains highly concentrated in a narrow range of occupations. The situation has not evolved much since the 1970s and there is no firm reason to believe that it will change in the coming years, unless the effort to upgrade these occupations, in particular by taking into account the specific characteristics of women's jobs, is made a central policy concern.

> At present, women and men are in effect working in two quite separate markets

Labour force participation rates and employment rates are commonly used to assess the labour market. However, participation rates have the inconvenience of excluding people who are not in a position to seek employment, and it so happens that many of those people are women.

The employment rate, which is the percentage of people with a job in a given labour force, is a more revealing measure of women's performance in the labour force. It is a particularly relevant indicator for the 25–54 age group, since it is in this age group that women's responsibilities vis-à-vis their children and indeed their elderly relatives are at their greatest. In 1997, the differential between male and female employment rates in this age group varied considerably across the 29 OECD member countries. This gender differential has been reduced to less than 15 percentage points in the Nordic, North American and central European countries. In Finland and Sweden, it is under 5 percentage points, in sharp contrast with the situation in Mexico and Turkey, where the differential is over 50 points. The differential generally remains relatively high in Spain, Ireland, Japan and Korea, at between 25 and 40 percentage points.

In none of the countries is there any obvious relation between the male employment rate and the difference in rate between the genders. Both Iceland and Japan, for example, have the highest male employment rates, at 95%. But in the case of Iceland, the gender differential is small, at just 13 percentage points, whereas in Japan the differential is quite wide, at 30 points. Similarly, a low male employment rate does not necessarily point to a small gender differential. Spain and Finland have relatively low employment rates for men, 80%, but are at opposite ends of the scale as regards the gender differential. And there is no shortage of other examples.

The fact that there is no relationship in principle rules out the idea of any redistribution of jobs from men to women. At present, women and men are in effect working in two quite separate markets. Moreover, although differences in educational attainment have narrowed considerably and anti-discrimination legislation has been adopted in most countries, the persistent wage differential between the sexes – which is often of the order of 30% or more – proves that women do not have access to the same occupations as men. Segregation remains one of the major sources of gender inequality in the labour market.

Employment level for 25–54 year olds, 1997

	Men %	Women %	Difference percentage points
Australia	85	64	21
Austria	89	71	18
Belgium	86	63	23
Canada	84	71	13
Czech Republic	92	78	14
Denmark	89	77	12
Finland	80	75	5
France	86	67	19
Germany	85	66	19
Greece	90	51	39
Hungary	78	63	15
Iceland	95	82	13
Ireland	82	53	29
Italy	83	48	35
Japan	95	65	30
Korea	92	58	34
Luxembourg[1]	92	54	38
Mexico	95	44	51
Netherlands	90	65	25
New Zealand	82	65	17
Norway	90	80	10
Poland	82	67	15
Portugal	88	70	18
Spain	80	43	37
Sweden	83	79	4
Switzerland	93	74	19
Turkey	88	28	60
United Kingdom	85	71	14
United States	88	74	14
OECD Europe	85	59	26
Total OECD	88	63	25

1. 1996
Source: OECD, Employment Outlook, 1998

In OECD countries, both men and women work in an occupation where their own gender is in a strong majority. Over half of the occupations surveyed are more than 80% 'dominated' by the same gender. The scale and permanence of the phenomenon are such that it is customary to talk about 'traditionally male' and 'traditionally female' jobs.

But there are five times as many male-dominated occupations in the OECD countries as there are female-dominated ones. Women's employment is therefore narrowly concentrated in a small number of highly female-dominated occupations. Yet on average women account for over 40% of total employment in the OECD area.

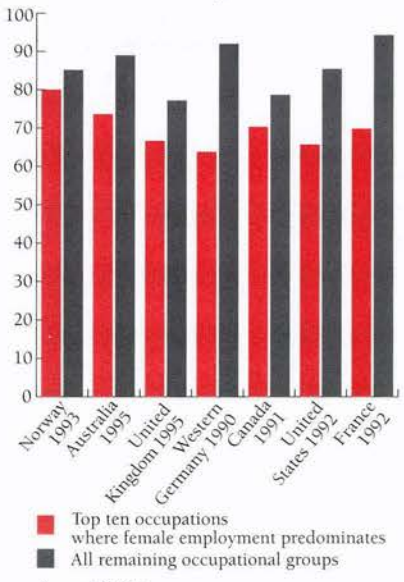
On the whole, female-dominated occupations are very labour intensive. And three occupations are particularly representative of female-dominated occupations: secretaries, teachers and nurses. Other occupations which also employ a great many women are 'feminised' to a varying degree, such as jobs in retailing, and hotel and catering. Lastly, there are a few other occupations which are seen as being very similar to the role of the housewife, such as domestic workers and home helps, which are almost entirely taken up by women.

In today's society, occupation very largely determines an individual's social and economic status. In this regard, the gender segregation of occupations brings out some marked differences that are detrimental to female-dominated occupations because they further inhibit female access to the occupations which attract the most prestige, the most power and the highest incomes. These occupations are still by and large a male 'preserve'. Female-dominated occupations have lower standing in terms of income, career prospects and social recognition.

A deepening divide

Rather than improving, as one might expect at the end of the dawn of the next century, this segregation and undervaluing of women's employment may be deepening. Some upgrading of female employment may therefore be needed Proactive measures taken in a number of countries to get women into non-traditional jobs have had a major symbolic effect, but little real impact so far in altering the basic pattern. Women are continuing to drift towards the predominantly female occupations in the future. This is not without its advantages. In many countries there are massive job losses in male-dominated occupations, while the bulk of new jobs nowadays being created are in the tertiary sector, where female occupations are highly concentrated.

The wage penalty of segregation
%



Source: OECD

Observers Past

In recent years the concept of equality has evolved: the principle of equal pay for 'work of equal value' is becoming established. Most countries have laws to this effect... [but] it has proven difficult to raise the pay of women workers to that of their 'male counterparts', because there are no exact counterparts.

March 1979

Governments and social partners have not so far shown themselves to be sensitive enough to the question of upgrading of female-dominated occupations, though they do recognise that occupational segregation is a major factor behind women's disadvantaged position in employment. The measures taken thus far have been designed more to reduce segregation than to tackle its root causes. Some equal opportunity programmes of the 1980s have worked quite well, particularly those that sought to make working and family life more compatible and allowing women to participate fully in the work force. But more has to be done in specific areas. Upgrading of female occupations, opening up new career prospects, updating skills, work reorganisation and wage equality – action on all these fronts would improve women's prospects in employment, as well as improving equality between the sexes. ■

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Relaunching African development

MICHEL ROCARD, CHAIRMAN, COMMITTEE ON DEVELOPMENT AND CO-OPERATION, EUROPEAN PARLIAMENT

What does the future hold for European development co-operation in Africa? That was the keynote question Michel Rocard addressed at an informal seminar held in February by the OECD's Development Centre. The *Observer* invited the former French prime minister to sum up his views.

The year 2000 will mark the 25th anniversary of development co-operation between the European Union and the ACP (African, Caribbean and Pacific) countries. To date, the results have been mixed. In volume terms, the latest agreement on the Lomé IV Convention signed in 1995 represents an overall commitment of some $15 billion over 5 years, which despite being divided between 71 nations is nonetheless a substantial sum.

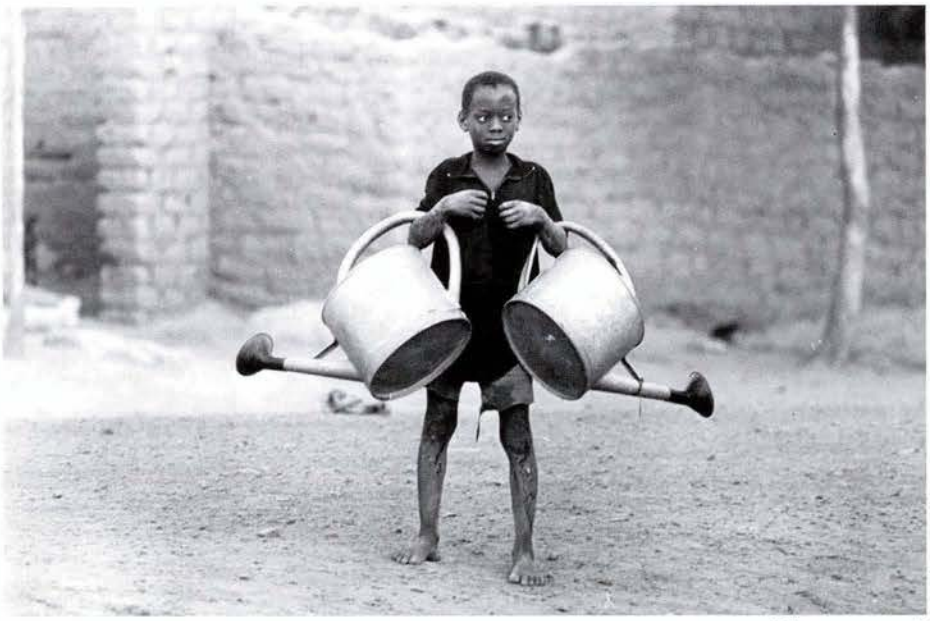
Mauritius is the only nation to have succeeded in using European development co-operation to promote its own economic growth. The Mauritian economy has now taken off, thanks to continuous democratic government and the intelligent use made at local level of the country's matching contribution. Furthermore, the Sugar Protocol has enabled Mauritius to diversify its activities and double its GNP within the space of ten years.

The fact remains that none of the other ACP economies has really taken off. They might have been worse off without development aid, but the relevance of that aid is still a burning issue. Should European assistance be redirected to the poorest countries? We would then run the risk of addressing poverty on the basis of national statistics, which gives a completely false view since the worst poverty-stricken areas in Africa are not only Mali, Niger and the Comorosh but also the cities of Lagos and Abidjan. We should also bear in mind that, if the Lomé Convention were to disappear, these countries would slide back into isolation.

For development policy, the present geographical framework remains valid, with the possible addition of two more countries, South Africa and Cuba. South Africa is already attending the Lomé negotiations as an observer. As for Cuba, it is high time that it improved its relations with the rest of the world and was helped to introduce a more democratic regime.

The greatest shift in European policy on development co-operation has been the determination to add a policy dimension to the Lomé V Convention. This will cover three areas: security, human rights and good governance. Civil war, *coups d'état*, corruption, bad governance and ethnic or tribal conflicts are far greater obstacles to development than isolation, drought or flooding.

Crisis prevention is an important aspect of security. It can save not only money, but also human lives. The European Parliament has therefore proposed setting up units to monitor regional tension. The British government has also taken the welcome initiative of persuading EU Member States to discuss a code of conduct for arms exporters. This provides a good opportunity to raise the issue of a code of conduct for the continents that receive development assistance. Training for those who carry arms (police, army, special services), with instruction in the process of law, human rights



Gérard Rancinan/Sygma

Where to turn?

and interrogation techniques, could also receive the backing of the European Union.

With regard to human rights, Europe's development co-operation should include education in good governance and training programmes targeted at lawyers and journalists. However, I fear that Europe is drawing the ACP countries into what I would call a rush for democracy. It is quite understandable for us to be increasingly demanding about how our funds are spent. It is certainly unacceptable that a third, if not more than a half of EU funds, should end up lining the pockets of a local head of state. True, a growing number of African heads of state are now democratically elected, and Africa is clearly moving towards greater protection of human rights. But it is not moving as fast as some in Europe would like.

Having started out in politics as a militant protesting against the colonial wars, I am now beginning to speak out against those who seek to lecture others on civilisation. Because they live in countries with a well entrenched culture of democracy, in some cases going back 200 years, they demand that African countries achieve the same level of democracy quickly. They are even ready to suspend aid when those countries fall short.

This attitude is quite unrealistic. Democracy is a lengthy process and there are bound to be slip-ups on the way. A balanced judgement means taking a long-term view.

With regard to the economy, our main concern should be to help ACP countries gain access to world markets. While Africa's share of world trade has dropped from 6% to some 2% since 1950, its rate of growth has been approaching the 5% mark since 1992–1993. So the idea that these countries can improve their performance, notably on exports, must not be ruled out.

Promoting regional common markets to encourage trade is a good idea, but it is not enough. Africa is divided into two broad areas, WAEMU in the west with three French-speaking nations, and SADC in the south with 14 English- and Portuguese-speaking nations. Three of the SADC countries are at war with four others and some countries are almost hopelessly isolated.

Until now Europe has conducted an asymmetrical policy of regional preferences, but these are prohibited under the new WTO rules. In the course of international negotiations, we might have requested a permanent waiver since the 71 ACP nations and 15 EU Member States hold a majority in the WTO. But this option would have meant complying with a WTO rule whereby all waivers are reviewed annually. The outcome would have been tariff volatility, which would be highly damaging to African development. The European Commission has accordingly asked the WTO for a 5-year transition period. We in the European Parliament, however, have wisely requested a 10-year transition period, since many isolated African countries use high duties (up to 60%) to protect their economies and could not withstand such draconian changes over so short a period of time.

If we create a situation whereby countries can borrow money knowing full well that they will never be able to pay it back, development will grind to a halt.

The importance of foreign trade should, however, be viewed in context, since development is above all endogenous. Developing countries have a tremendous need to import the tools for capital goods that they cannot produce themselves. But they must at all costs avoid creating local pockets of over-development; Africa, for instance, has been landed with large, self-contained manufacturing plants with very few spin-offs for the surrounding area, and these merely foster two-tier development.

Debt is stifling almost two thirds of all African countries. Debt only becomes more or less tolerable if it absorbs no more than 40% of export revenue. If we create a situation whereby countries can borrow money knowing full well that they will never be able to pay it back, development will grind to a halt. These countries must therefore be allowed to pay off a substantial portion of their debt in local currency, either as capital for private enterprise – the IMF has already accepted this idea – or as financing for development projects.

The fact that priority must go to the private sector needs to be acknowledged, but the public sector should not be overlooked. We should not forget that education, healthcare and roads are government issues. Africa's main problem lies in communications (railways and roads); once that has been solved, the continent will be half way along the road to development. We must therefore defuse the debate and view it in a more technical light.

Growth is not enough

Growth has never succeeded in eradicating poverty. What are needed are specific tools that can address the problem directly. This means promoting decentralised co-operation of the kind provided by our cities, regions and NGOs in Europe. It is better at tackling problems on the ground and because it provides smaller amounts

of funding, is less prone to corruption. We should also back the development of micro-enterprises, since the grassroots economy does, after all, provide a living for 70% of the population on the African continent.

Scientific research aimed at eradicating poverty needs to be more closely targeted. It might focus on developing new species of food crops and livestock, for instance, or experimenting with drip irrigation for smallholdings. In shantytowns, roofs are made from food packaging. Why not develop research into watertight packaging? Africa imports 98% of its pharmaceuticals. Yet it is the continent with the richest flora in terms of active principles. And none of them are processed domestically.

Of course I have some concerns about Africa's future, but we should not overlook the political progress it has made. Apart from the crisis in the Great Lakes area, almost two-thirds of the continent is stable. Mauritius and South Africa are two remarkable examples. Nor should we write off the countries that are just beginning to emerge. If Kenya maintains its political stability when power is handed over, if Uganda plays all its cards well without being too preoccupied with military imperialism in the region, and if Côte d'Ivoire is careful to foster good governance and transparency, then development can really take off. ■

Development aid: snapshots of recent trends[1]

YASMIN AHMAD, DEVELOPMENT CO-OPERATION DIRECTORATE

Declining trends

ODA has declined markedly. In fact in 1997 it represented only 0.22% of DAC Member's GNP, the lowest level since the ODA concept was introduced in the 1960s. In contrast, private flows have risen sharply in recent years, as the first chart shows, reflecting the influx of foreign direct investment into recipient countries. However, the figures do not yet reflect the full impact of the Asian and Latin American crisis on private flows (specifically Foreign Direct Investment).

Flows by DAC countries to developing countries
(Part I of the DAC list of aid recipients)
$ billion

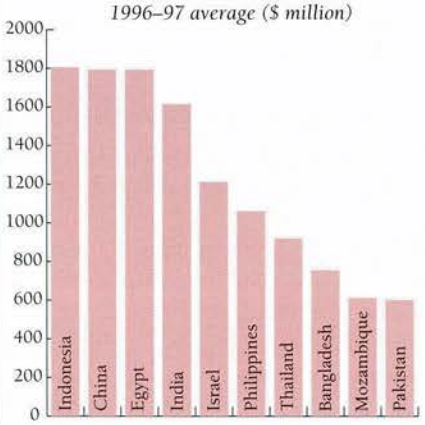
	1993	1994	1995	1996	1997
Total receipts, net	113	143	141	176	174
of which:					
Total ODA, net	39	41	41	39	32
Total OOF, net	7	9	9	6	6
Private Sector, net	67	93	91	131	136
of which:					
Direct Investment	38	49	52	59	79

Source: OECD

Asia tops receipts list

The two largest recipients of bilateral aid from individual donor countries over the last two years were in Asia, namely Indonesia and China. Egypt, the largest African recipient, was next. Total bilateral gross ODA in 1996-97 came to $ 43 billion. Bilateral Official Aid (OA) from DAC countries to Part II countries were a little over $ 4 billion in 1996-97.

Top ten aid recipients of DAC countries' aid
Gross ODA disbursements
1996–97 average ($ million)



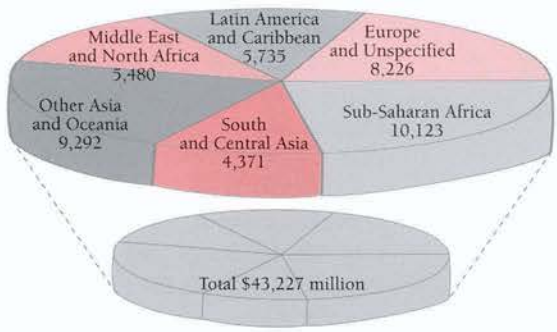
Source: OECD

OECD and Development

The OECD is the only comprehensive source of data on aid flows to developing countries and an important source of data on private flows. The Organisation's data bank on development, run by the Development Assistance Committee (DAC), collects information on the volume, origin and types of aid and other resource flows to both traditional developing countries – Part I of the DAC List of Aid Recipients – and countries in transition – Part II of the DAC List of Aid Recipients.

Geographical Distribution of Financial Flows to Aid Recipients looks at aid from the point of view of the recipient, and shows each country's intake of Official Development Assistance (ODA) or Official Aid (OA), Other Official and Private flows from DAC members, multilateral agencies and other donors. The aim is to provide a complete record of the long-term external financing for each aid recipient, broken down by donor, recipient and type of flow.

DAC Countries' Gross bilateral ODA by region
1996–97 average
$ million



Sub-Saharan Africa's share

Looking at DAC data by region, it is clear that sub-Saharan Africa receives the largest share (24%) of gross bilateral ODA from DAC Member countries. This represents an average of $17 per capita in this region. The biggest recipient by value from that region was Mozambique, with $613 million. Tanzania was next, with $598 million. The smallest recipient in sub-Saharan Africa was the Seychelles, with $8 million.

How is the aid actually spent?

The pattern reflects the stage of a country's economic development. The OECD's data, which is also broken down by sector, shows that aid to the poorer countries focuses on the social programmes – mainly education, health, water supply and sanitation – and next on economic infrastructure, such as transport and energy projects. The mix changes as the country moves up the income scale, in line with the recipients' new socio-economic situation. Nearly half of DAC countries' ODA commitments to Brazil, for example, is geared towards the protection of the environment and debt relief. ■

Total ODA commitments by purpose
% of total, selected recipients, 1996

	Brazil	India	Indonesia	Tanzania
Social infrastructure and services, total	20.9	39.9	12.8	41.4
Economic infrastructure and services, total	16.0	23.5	48.0	19.7
Production services, total	18.1	28.8	15.5	9.5
Multisector/Crosscutting	21.3	4.6	15.8	5.8
Commodity aid/ Programme assistance	0.3	1.2	7.6	17.1
Action relating to debt	22.2	1.8	0.1	4.2
Emergency assistance	0.6	0.1	0.0	0.4
Support to NGOs	0.5	0.0	0.0	0.0
Unallocated/Unspecified	0.2	0.1	0.1	1.9
Total	100.0	100.0	100.0	100.0

Source: OECD

1. Based on the Geographical Distribution of Financial Flows to Aid Recipients, *published in print and on CD-ROM. The DAC database may be accessed online by subscription at http://www.oecd.org/dac/htm/online.htm.*

Observers Past

Ministers noted that the problem of aid and trade relationships between the developed and the developing countries were being reassessed, both by international agencies and by individual governments, and expressed the hope that these reviews would contribute to more effective national and international policies and actions.

Ministerial Council, February 1969, March edition

ILO/BIT

OECD strikes out against bribery

CONTACT: HTTP://WWW.OECD.ORG/DAF/NOCORRUPTION

Every year some $80 billion is paid out worldwide in the form of bribes or some other pay-off. To put this amount into perspective, it is more than New Zealand's GDP and half the size of Norway's. And $80 billion probably represents the tip of the iceberg. Whatever the size, for the OECD the principle remains a simple one: bribery of foreign government officials to obtain, or retain, business is a serious threat to democracy. It misdirects resources, undermines development and distorts competition. It is a distortion that the OECD is committed to removing.

Bribing domestic public officials is already a crime in most countries. The Convention on Combating Bribery of Foreign Public Officials in International Business Transaction, which entered into force on 15 February 1999, sends a strong and clear signal to all trading partners that members of the Convention will also criminalise bribery actions used to obtain business deals abroad.

From now on, bribery of foreign public officials will be a punishable offence and subject to the same types of criminal penalties that exist were the bribe extended to a public official at home. Under the convention, which was signed in 1997, any person exercising a public function for a foreign country can be considered a foreign public official. That could mean a company officer of a public enterprise or the head of a government designated monopoly. Indeed, senior representatives of any company in which the domestic government exercises a dominant influence are considered as foreign public officials.

For the Convention to apply, a physical presence in the foreign country to effect the bribe is not required. A phone call, fax or e-mail would be enough.

Under the Convention, it would be bribery if what is offered, promised or given is money or some other type of advantage, if the bribe was done directly or through intermediaries, or if the bribe was for the benefit of the foreign official or a third party. It is immaterial if in exchange the company receives a business contract or some other form of improper advantage, such as an operating license.

The fight against corruption calls for a broad spectrum of measures, of which the Convention, addresses a particular type of bribery, may be only one. Other issues relating to corruption need further study.

Presently, the Working Group on Bribery is examining acts of bribery through foreign political parties, bribery involving candidates for foreign public office, and bribery through foreign subsidiaries, among others. The Group is also paying particular attention to the use of offshore financial havens and practices that block effective investigation and prosecution of cases of corruption.

The Convention is open to any country that becomes a participant in the Working Group on Bribery. Some 34 countries, including five non-OECD members, have signed the Convention, but only 12 of them had ratified by 15 February. Still, that was enough to enable it to enter into force because those 12 represented more than 60% of the combined total value of OECD exports, the agreed formula for entry into force. The 12 countries are Canada, Finland, Germany, Greece, Hungary, Iceland, Japan, Korea, Norway, United States and United Kingdom. Bulgaria was the only one of the five signatory non-OECD members to have ratified. The fact that a large number of signatories failed to ratify so far reflects legislative delays in individual countries and should not be taken to signal a falling away of support for the Convention. In fact, now that the Convention is in force, there will be strong political pressure on other countries to ratify.

> The biggest challenge lies in ensuring the Convention's success in criminalising the bribery of foreign officials

The Convention has met with some criticism. For example, the Convention focuses on 'active' bribery, or the so-called supply side of corruption. This was a logical place to start since multinationals in OECD countries represent, by far, the greatest source of bribe money. However, private businesses have argued that they are often faced with demand for bribes in order to clinch important overseas contracts. In their view the recipient of the bribe and what happens on the demand-side – so-called 'passive' bribery – is not covered enough by the Convention. Though the OECD points out that most of the signatory countries already have laws against demanding bribes and that other international agreements, such as the Council of Europe's Criminal Law Convention on

Corruption, deal with it, it isholding discussions on these matters.

In addition, some countries were sceptical that the Convention would create the level playing field for business it intended to, as in several countries tax deductibility of bribe payments was still tolerated. However, the OECD recently reported that by the end of 1999 such tax deductibility would no longer be possible in any of its member countries.

Perhaps the biggest challenge for the OECD lies in ensuring the Convention's success. Every participating country has an interest in ensuring that all other partners in the Convention criminalise the bribery of foreign public officials. The signatories' Working Group on Bribery, which will make recommendations to the ministers concerned, will carry out monitoring and surveillance. Moreover, the OECD has an anti-corruption unit for monitoring the Convention. The OECD is not alone in the battle against corruption – the World Bank, the IMF, the Council of Europe, the European Union are all involved. The OECD's convention adds to the strength of that armoury. ■

Getting the Mediterranean region to work together

The countries of the southern Mediterranean suffer from a crucial lack of capital, and there is a danger of investment flows going to the centre – particularly European countries – from the periphery, which in the event is MENA, which regroups the Middle East and North African countries of the Mediterranean basin). This risk, sometimes referred to as hub-and-spoke, is that much greater in that all the countries are linked to Europe by bilateral agreements and that trade relations between them are relatively infrequent. How to prevent this periphery-centre divide from deepening was a recurrent theme of the conference organised by the OECD Development Centre, the World Bank and the Economic Research Forum, 'The Dynamics of New Regionalism in MENA: Integration, Euro-Med Partnership Agreements and After', held in Cairo (Egypt) in February 1999.

A number of southern Mediterranean countries have already signed free trade agreements with the European Union, which provide for the dismantling of tariff barriers for manufactures over a period of twelve years[1], while others are on the point of doing so. The expected impact of the Euro-Med Partnership must not be confined to the gains resulting from a mere reduction in customs tariffs, the key to success lying more in the potential dynamic effects on industrial development, technology transfers and direct investment. Nevertheless, domestic reforms are needed in order to pursue macroeconomic stabilisation and improve the business environment.

There are a great many impediments to the growth of foreign investment: administrative shortcomings, monopolies, poor infrastructure and lengthy customs procedures are a few examples. What is more, far too many reforms have been announced but never implemented. Policy credibility is essential if foreign investors are to regain confidence.

Superstock

Cairo – a Mediterranean metropolis

At present, trade between the countries of the region, which represents a market of 300 million people, accounts for only 5% of total exports to the rest of the world. Still, a number of the conditions for successful regional integration are there: a common cultural and linguistic heritage, complementary economic structures and geographical proximity. The last attempt at regionalism goes back to 1997 and the signing by eighteen Arab countries of AFTA (the Arab League Free

1. The Euro-Med Agreements were signed by Morocco, Tunisia, Israel, Jordan and the Palestinian Authority. They are under negotiation with Lebanon, Algeria and Syria.

Trade Agreement). This provides for the dismantling of tariff and non-tariff barriers over a 10-year period, starting on 1 January 1998. The object is to encourage the Arab countries to create regional norms, promote free circulation of capital and labour – that of individuals is not included in the Euro-Med Agreement – and improve trade and infrastructure networks. All of this would have the effect of reducing costs and increasing productivity, while at the same time preventing the Arab countries from being at the mercy of the economic situation in Europe. They would then be better equipped to contend with the next stage of liberalisation planned by the WTO.

Credibility has to be reciprocal

The warning was made at the Cairo conference that the dismantling of the Multifibre Arrangement, for example, would certainly affect countries such as Morocco, Syria, Egypt and Tunisia, where between 20% and 40% of total exports are accounted for by textiles. Another point emphasised by the experts is that agriculture and services cannot be left out of the agreements. An OECD study on the Tunisian economy shows that agriculture has everything to gain from opening up, rather than remaining sheltered and restricted to its target of self-sufficiency[2]. Liberalisation will have to be accompanied by transfer mechanisms for rural populations. For its part, Europe has to open its markets further to agricultural produce from elsewhere in the region. As one speaker pointed out, credibility has to be reciprocal; at present the Euro-Med Partnership resembled a sort of marriage contract whose terms were borrowed from divorce proceedings. ■

2. *'The Liberalisation of Tunisian Agriculture and the European Union: A prospective Analysis', by Mohamed Abdelbasset Chemingui and Sébastien Dessus, Technical Paper No. 144, OECD Development Centre, February 1999.*

E-commerce continues to take off

CONTACT: HTTP://WWW.OECD.ORG/SUBJECT/E_COMMERCE/

If you are running a small or medium sized company, then the world may well be your oyster. The electronic world, that is. That was one of the optimistic messages arising from a seminar on electronic commerce, hosted by the OECD in Paris in February.[1] The argument was made that e-commerce, whose value was expected to reach $1 trillion in the next three to five years, is ideally suited to small and medium sized firms. For a start, it was inexpensive to set up a website, certainly when compared to opening up shops in city main streets. And the global reach of the internet was far greater than was possible for most small businesses in traditional physical markets too. In fact, not only is the Internet suited to those smaller firms that already exist, but it was the catalyst for the creation of new ones.

The OECD has been involved in e-commerce work for 20 years or so now, but in recent years that work has taken on a new momentum, and a full Ministerial was held on it in Ottawa last October. The February 4 seminar was a progress check on that work. It was suggested that the Organisation's job was to demystify and explain e-commerce, to bring this quite tricky and elusive aspect of cyberworld 'down to earth'. That means understanding it to better legislate for it. That is why gathering data is so pivotal to the OECD's work. E-commerce has no time for borders; from a purely business viewpoint that is its attraction, and it is perhaps not that surprising that business-to-business trade has dominated e-commerce so far. But for governments, its mercurial quality poses a serious challenge. There are questions concerning consumer protection and privacy on the net. Another riddle is how to tax earnings from cross-border electronic transactions. In the physical world legal and technical mechanisms obviously exist to take care of this, but not yet enough in the e-world. Electronic businesses are developing rapidly, decentralising decision-making and swelling (often untaxed) financial flows. In other words, e-commerce is a serious structural issue for OECD policy-makers which does not seem to fit the taxation paradigm of the physical market place. Some advances have been made, such as the OECD's taxation framework for e-commerce, concluded in 1998. Still, much remains to be done before governments will feel in tune with the challenge posed by electronic commerce. In the meantime, the fifth wave of growth, the digital age, will continue its forward roll. And small businesses will undoubtedly be among those riding it. ■

1. *OECD information seminar on electronic commerce, Paris 4 February 1999.*
Most recent publication: The Economic and Social Impact of Electronic Commerce, *OECD 1999.*

Upcoming events 1999

Please note that the meetings listed are not open to the public but are listed as a guide to current OECD activities. Some are open to the media. All meetings are at OECD headquarters in Paris, unless otherwise stated. For further information, please contact the Media Relations Division or consult the OECD website at www.oecd.org.

March

23
Council of Europe/OECD *Convention on Mutual Assistance in* ***Tax*** *Matters.*

24-25
European Union Summit on Agenda 2000. Bonn, Germany.

24–26
Disabled Students and Higher ***Education****,* meeting organised by the Directorate for Education, Employment, Labour and Social Affairs. Grenoble, France.

25–27
Improving Relations between the Administration and the Public, conference organised by the **Public Management** Service in co-operation with the Network of Institutes and Schools of Public Administration in Central and Eastern Europe. Sofia, Bulgaria.

26–30
Forum on International **Life Sciences**: *Biovision*, under the auspices of OECD. Lyon, France.

29–30
Towards a New Role for Spatial ***Planning****,* conference organised by the Territorial Development Service.

29–31
Biological ***Resource*** *Management: Connecting Science and Policy,* conference organised by the Directorate for Food, Agriculture and Fisheries.

April

8–9
Securities Market Reforms in the face of the ***Asian*** *Financial Crisis,* round table organised by the Directorate for Financial, Fiscal and Enterprise Affairs and the Centre for Co-operation with Non-Members.

12–13
Paying for the Care of Frail ***Elderly*** *Persons: Consequences for Women Caregivers,* meeting organised by the Directorate for Education, Employment, Labour and Social Affairs.

12–14
Environmental Monitoring, **OECD/China** seminar organised by the Environment Directorate and the Centre for Co-operation with Non-Members. Beijing, China.

14–16
Bribery*,* meeting of the Working Group organised by the Directorate for Financial, Fiscal and Enterprise Affairs.

15–16
Improving Capacity for ***Policy Making****,* regional workshop organised by the Public Management Service and the Centre for Co-operation with Non-Members. Bucharest, Romania.

22–23
Preventing and Combatting the ***Employment of Foreigners*** *in an Irregular Situation,* seminar organised by the Directorate for Education, Employment, Labour and Social Affairs. The Hague, Netherlands.

28–30
Agricultural Policies *in Non-Member Countries,* forum organised by the Directorate for Food, Agriculture and Fisheries.

29–30
Public Enterprise Reform in ***Brazil****: The Case of Public Utilities,* international seminar organised by the Development Center in co-operation with the Brazilian National Development Bank. Rio de Janeiro, Brazil.

May

4–7
Extended Producer Responsibility and ***Waste*** *Minimisation,* workshop organised by the Environment Directorate.

6–7
Economic Policy Committee Meeting, broad agenda.

10–11
Improving the Contribution of ***Transport*** *Economics Research to Policy Making,* seminar organised by the European Conference of Ministers of Transport.

11–12
Development *Assistance Committee* high-level meeting.

11–15
Economic Reform, Securities Markets and Fraud*: A Workshop for Journalists and Market Regulators,* organised jointly with the World Bank, the Centre for Co-operation with Non-Members, and the OECD Centre for Private Sector Development. Istanbul, Turkey.

17
Science and Technology ***Labour*** *Markets,* workshop organised by the Directorate for Science, Technology and Industry.

18
Preliminary version of the ***Economic Outlook*** *No. 65.* News conference.

May (continued)

19–20
Meeting of the *Council of the European Conference of Ministers of* ***Transport*** *at Ministerial level*. Warsaw, Poland.

19–21
Regulatory Aspects of Decommissioning, joint **Nuclear** Energy Agency/International Atomic Energy Agency/European Commission Workshop. Rome, Italy.

20–21
Ageing–Related Diseases, meeting of the Working Party on Social Policy organised by the Directorate for Education, Employment, Labour and Social Affairs.

24–25
IEA meeting at Ministerial level and the 25th Anniversary of the International Energy Agency (IEA).

26–27
OECD Council at Ministerial level meeting. Foreign Affairs, Finance and Trade Ministers hold their annual two-day meeting. Mexico chairs the meeting. News conferences.

31/5 – 1/6
Shipbuilding Council Working Party.

Signing of the OECD Convention, 1960

OECD

Xenotransplantation: what issues?

Xenotransplantation is the transplantation of organs, tissues or viable cells from one species to another – in particular, from animals to humans. As animals tend to be raised for it, it is also called organ farming. And it is yet another example of scientific progress confronting society with a controversial and emotionally charged issue which is in need of a coherent policy framework.

Born out of the success of transplantation as a life-saving and cost-effective form of medical treatment, it is one of the options currently advanced for filling the growing gap between the supply and demand of available human organs.

But is it safe? Is it really an economically viable solution? And where does society stand on the ethical issues involved? Given the many uncertainties and the public concern about genetically modified organisms, what is the state of play with xenotransplantation and how soon can we expect to be faced with its practical implementation on a large scale?

Xenotransplantation: International Policy Issues provides a highly readable and clear account of how far along the road xenotransplantation has advanced and outlines both the open questions and possible mechanisms for their resolution.

The book summarises the proceedings of a recent workshop held with world leaders on the subject in New York, from which it appears that xenotransplantation is progressing rapidly and could be capable of significantly improving the quality of patients' lives in the near future. Thanks to big advances in biotechnology, transgenic technology and cloning over the past decade, the risks of xenograft rejection may soon be reduced to an acceptable minimum.

However, other essential scientific and medical criteria remain unfulfilled. The author gives an account of the research currently being done on pigs and baboons as potential donors and sets out the limitations encountered. The very reason why primates are well-suited for transplantation – their close evolutionary relation to humans - also increases the risk of infection and pathogenicity. This means that there is still considerable concern over the use of these animals. The book stresses the urgent need for international co-operation to set a research agenda on unresolved risks of infection, to network national and international monitoring of infectious diseases and to address the issue of how to follow xenotransplantation patients across borders or to prevent altogether uncontrolled use of the technology.

There is also an important economic dimension to be considered: who will bear the costs for research and public health safety mechanisms. These questions have not yet been adequately addressed. The Xenotransplantation is already attracting substantial private investment and private companies are playing an increasingly critical role in promoting the development of the technology. Market research from 1996 reveals a significant potential for profit. Still, is too much being committed, too much expected, too soon?

Particular attention is given in the book to the need to guarantee the dignity, health and personality of the recipient on the one hand and the welfare of the donor animals on the other. International guidelines for animal husbandry are vital for protecting biosafety and animal welfare as well as for regulating the export and import of organs and animals.

However, while ethical principles are generally universal, they need specific interpretation in the light of local cultures. The issue gives rise to a serious debate on prevalent ethical or socio-legal concerns – for example, is xenotransplantation consistent with a humane and fair medicine or does it conflict with efforts to develop better approaches to preventive medicine? Answering such questions will be essential if public acceptance is to be achieved. Ms Ronchi's book may help us to do so.

Xenotransplantation: International Policy Issues
by Elettra Ronchi
OECD, Paris 1999
FF150 US$27 DM45 ¥3200
ISBN 9264170308 (93 1999 03 1 P), 102 pages

Publications December 1998/February 1999

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A Framework for the Design and Implementation of Competition Law and Policy
December 1998
(24 1999 01 1 P) ISBN 08-21-34288-6 200pp.
FF536 US$95 DM160 £57 ¥11400

NEW JOURNAL

OECD Journal of Competition Law and Policy
Volume 1, No. 1
February 1999
Review of United States Competition Law and Policy
Competition Law in the Courts
Recent Developments in National Merger Laws and Policies
Competition and Railroads
(24 1999 21 1 P) ISBN 92-64-17003-0 250pp.
FF290 US$50 DM85 £30 ¥6900

Development and Aid

Gazette – Creditor Reporting System Fourth Quarter 1998
Quarterly Report on Individual Aid Commitments
December 1998
(43 1998 54 3 P) ISBN 92-64-05739-0 184pp.
FF65 US$12 DM19 £8 ¥1400

Geographical Distribution of Financial Flows to Aid Recipients – 1999 Edition
January 1999
(43 1999 01 3 P) ISBN 92-64-05836-2 322pp.
FF395 US$69 DM118 £42 ¥9150
Also available on CD-ROM

Stakeholders: Government-NGO Partnerships for International Development
Edited by Henry Helmich, Ian Smillie
February 1999
(41 1999 03 1 P) ISBN 18-53-83589-7 336pp.
FF250 US$44.8 DM74.6 £25 ¥5272

External Debt Statistics: The Debt of Developing Countries and Countries in Transition at end-1997 and end-1996
December 1998
This annual report provides detailed information on the amount and composition of the external debt of each of 172 countries and territories (in effect, worldwide coverage of non-OECD countries) at the end of 1997, with corresponding revised figures for 1996. In addition, estimates are provided of the amortization payments due by each country on long term debt in 1998.
(43 1998 16 1 P) ISBN 92-64-16968-7 40pp.
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Development Co-operation Report 1998: Efforts and Policies of the Members of the Development Assistance Committee
1999 Edition
February 1999
The financial crises in emerging markets in the course of 1997 and 1998 have reinforced the basic thrust of the agreed OECD/DAC co-operation strategy. The challenges of development are more complex and formidable than many had foreseen, but the vulnerabilities revealed by the recent crises demonstrate the need to help strengthen the foundations of sustainable development. The basic challenge remains implementing people-centred and results-oriented partnerships to encourage and support locally-led efforts. This has now taken hold internationally as the standard for effective development co-operation. Yet, there remains a need to put partnerships into practice more swiftly and more systematically.
'Staying the course' is the theme at the heart of the 1998 *Development Co-operation Report*. The report documents some of the progress achieved and underway to implement such strategies, and urges accelerated action with a wider range of partner-countries.
This volume tracks DAC Members' efforts – qualitative and quantitative – to move ahead with the implementation of partnership strategies. Policy progress underway and expectations for further action are examined alongside the disturbing picture of further decline in 1997 in aid flows from the larger donors and, for the first time in this decade, an aggregate decline in private flows to the whole range of developing countries.
(43 1999 02 1 P) ISBN 92-64-17002-2 252pp.
FF220 US$38 DM65 £23 ¥5200
Also available on Diskette

Development Centre Seminars

Growth and Competition in the New Global Economy
Edited by Luiz R. de Mello
January 1999
The integration of the newly emerging economies (NEEs) into the global economy not only raises major challenges for OECD member countries, which must adapt to new sources of competition, it also forces emerging economies to equip themselves with the policies and structures necessary to operate successfully in the global marketplace. That these challenges have still not been adequately taken up has been amply demonstrated by the financial crisis which struck Asian NEEs in mid 1997. Hence the need for more dialogue, on both the domestic and international levels, to reform policies and to avoid policy failures and crises in emerging economies, with ensuing impact on the industrialised countries.
This book moves in that direction by dealing with issues as varied and complementary as: the perspectives for an integrating world economy; the financing of economic reform; employment generation and poverty alleviation; or the role of institutions in economic development. These themes are tackled in the light of the experience of Asian newly industrialised countries, namely Korea, China and India. This publication offers a stimulating, well-informed tour of the issues which policy makers will have to resolve if the integration of the NEEs into the world economy is to be facilitated.
This book brings together the presentations made during a conference organised jointly in Seoul by the OECD Development Centre, the Korean Development Institute and the International Center for Economic Growth.
(41 1999 01 1 P) ISBN 92-64-16973-3 200pp.
FF220 US$38 DM65 £23 ¥5200

Development Centre Seminars

Financial Liberalisation in Asia: Analysis and Prospects
Edited by Douglas H. Brooks, Monika Queisser
February 1999
Rapid globalisation has brought substantial benefits to developing Asia, but it has also heightened the risks associated with policy mistakes, weak financial institutions, and problems in corporate and public governance. The 1997 Asian crisis has demonstrated the urgent need to rethink the sequencing and comprehensiveness of financial liberalisation. Would further opening of Asia's financial systems be helpful or counterproductive in fostering financial stability? What structural reforms do emerging economies need to undertake to ensure that capital inflows are transformed into productive investment? Which regulatory and other requirements would have to be attached to further financial liberalisation? And what role should international organisations and the private sector play in crisis resolution? This volume seeks to provide answers to these questions by discussing the roots of the Asian financial crisis and suggesting some constructive approaches to crisis resolution. It was produced jointly by the Asian Development Bank and OECD Development Centre based on their fourth joint annual Forum on Asian Perspectives.
(41 1999 02 1 P) ISBN 92-64-16974-1 200pp.
FF200 US$34 DM60 £21 ¥4750

Development Co-operation Reviews

European Community: No. 30
December 1998
The European Community (EC) is the world's second largest multilateral channel for development assistance (after the World Bank). Its combined programmes are the fifth-largest among the 22 Members of the OECD Development Assistance Committee (DAC), and EC programmes have grown an average 3.3% annually over the past five years, while the combined effort of DAC countries declined by 4.7% annually. The Community's allocation of resources to lower income countries has not kept pace, however, with the overall growth of the ODA budget over recent years.
EC programmes operate within a complex organisation and management structure, and Brussels faces serious challenges of implementation in adapting its operations to achieve agreed development objectives. There have been important steps in the evolution of the European Commission structures: a Common Service has been created to implement co-operation activities for the four Directorates General. But there is still a need to strengthen the capacity of delegations in the field to work fully with partners in advancing local ownership and co-ordination.

The EC has a strong role to play in improving the coherence of policies affecting developing countries. The report analyses this question in fields such as agriculture, trade, fisheries agreements and Community fishing fleet subsidies. Co-ordination with other donors also seems to be improving, which bodes well for better overall partnerships between donors and partner countries.
In 1998, the development co-operation policy of the following DAC Member countries will be reviewed: Canada, Finland, Germany, Luxembourg, Spain, and the United States.
(43 1998 17 1 P) ISBN 92-64-16965-2 132pp.
FF195 US$33 DM58 £20 ¥4650

Development Co-operation Reviews

Finland: No. 31
January1999
Following a steep decline in its development co-operation programme in the early 1990s Finland is engaged in redesigning and building up its aid programme. The Cabinet Decision-in-principle of September 1996 is now the main point of reference for Finnish development co-operation. It includes a firm target of 0.4 per cent by the year 2000 for the ratio of Finland's official development assistance to the gross national product (the ODA/GNP ratio), the integration of development co-operation into a coherent foreign policy framework and the reorganisation of the aid administration within the Ministry for Foreign Affairs.
At the DAC review of Finland's aid policies and programmes on 16 October 1998 the Committee commended both the partnership orientation of Finland's policies, as set out in the Decision-in-principle, and the growing volume of Finnish aid, a welcome reversal of the situation at the time of the last DAC Peer Review of Finland in 1995, when aid volume was in a deep decline. This Review addresses several other key issues: Finland's long-term partnerships with primary orientation countries; the flexibility concept, included in the Decision-in-principle; the need for clear sectoral and cross-cutting policy guidance; field management and delegation to the field; and the revised screening process for project and policy proposals that is part of the quality control system of Finnish aid.
The DAC Peer Review Programme for 1998 includes: Canada, Spain, the European Community, Finland, Germany, and Luxembourg and for 1999 Denmark, Japan, Ireland, Norway, Austria and Australia.
(43 1999 03 1 P) ISBN 92-64-17010-3 76pp.
FF120 US$20 DM36 £12 ¥2650

Development Co-operation Reviews

Luxembourg: No. 32
February 1999
Luxembourg's aid programme has made considerable headway since the first review by the OECD Development Assistance Committee (DAC) in 1993. The government has implemented most of the DAC's recommendations following that review. Measures taken by the government include: a new law defining the aims of co-operation; a selection of target countries; an increase in the number of staff assigned to the aid programme; an agreement governing relations between the Ministry of Foreign Affairs, Foreign Trade and Co-operation (MFA) and Lux-Development, the executive agency.
Over the last five years the volume of Luxembourg's official development assistance (ODA) has risen by an average of 15% a year in real terms. Luxembourg's development aid reached 0.55% of its gross national product (GNP) in 1997.
This advance has been made possible by the unanimous support of political parties and public opinion. The non-governmental organisations occupy a special place in the aid programme since a quarter of bilateral aid is channelled through them.
Luxembourg delivers its aid entirely in grant form, and largely untied.
The sharp rise in the volume of aid makes it important to control and improve the quality of projects and programmes by means of more stringent selection procedures, closer monitoring of projects and systematic *ex-ante* and *ex-post* evaluations. To that end it is crucial to reduce the number of recipient countries, to strengthen further human resources for the aid programme and to extend training for co-operation staff.
Apart from Luxembourg, the development co-operation policy of the following DAC Members were reviewed in 1998: Canada, the European Community, Finland, Germany, Spain and the United States.
(43 1999 04 1 P) ISBN 92-64-17017-0 60pp.
FF120 US$20 DM36 £12 ¥2650

Economic Analysis and Forecasting

OECD Economic Outlook
December 1998, No. 64
December 1998
The *OECD Economic Outlook* analyses the major trends in the OECD area that will mark the next two years. It provides in-depth coverage of the economic policy measures each Member country should adopt for the years to come. Recent measures and forthcoming developments in selected non-OECD countries in East Asia, Central and Eastern Europe, and South America are also evaluated in detail. In addition to the themes featured in every semiannual edition, this issue also addresses these important questions:
• What are today's downside risks for the world economy? What would a pessimistic scenario involve?
• What fundamental questions does the crisis in emerging markets raise, particularly for financial liberalisation?
• What macroeconomic policy challenges do governments in the euro area face?
• What are the implications of recent stock market developments?
• What are the characteristics of the long-term poor? How can OECD countries identify the people at risk of poverty and develop better policies to help them?
Last June, the OECD launched a new on-line service to provide early access to the main projections and analyses of its *Economic Outlook*. With a special password, all subscribers can have access to the core of the outlook via Internet one month before the book is published: www.oecd.org/publications/outlk_64. It includes a general assessment of the current macroeconomic situation, developments and projections for each Member country and certain non-member economies, and projections for key economic variables.
(12 1998 64 1 P) ISBN 92-64-15958-4 272pp.
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FF180 US$32 DM54 £19 ¥3950
Also available on CD-ROM and Diskette

Quarterly National Accounts Fourth Quarter 1998
February 1999
(36 1998 04 3 P) ISBN 92-64-05715-3 282pp.
FF135 US$25 DM40 £16 ¥2900
Also available on Diskette

Education

PEB Exchange: No. 36
January 1999
(88 1999 36 1 P) ISBN 92-64-16168-6 24pp.
FF80 US$16 DM24 £9 ¥1800

Higher Education Management
Volume 10, No. 3
December 1998
The articles in this issue show that whilst institutions continue to sustain their interest in quality assurance, evaluation and the overall structure of systems, increased attention is being paid to the content and organisation of education and to internal structures. Evaluation: Scandinavian models. Quality Assurance: European systems, Accreditation's role in the United States, The Mexican case. Merging of Institutions: The Norwegian experience. University Organisation: Systemic and contingency models. The Teaching Function: Organisation of the first cycle. The Finnish Open University: A testing arena for young adults.
(89 1998 03 1 P) ISBN 92-64-15965-7 160pp.
FF135 US$25 DM40 £15 ¥2900

OECD Proceedings

Children and Families at Risk: New Issues in Integrating Services
December 1998
Fears of the prospect of growing social exclusion have become important concerns in recent years for many countries. Improving the quality of education and the standards attained by students to improve employability is one of the tools being used to prevent exclusion. However, changing social realities are leaving young children and students more exposed than ever to failure at school and unemployment.
It is becoming increasingly clear that communities, education systems, schools and teachers are not equipped to deal with the many problems which arise and when social or health services become involved conflicts of interest can arise leading to actions which are not always in the clients' best interests.
The necessity to provide greater co-ordination among these services, to improve their efficiency and effectiveness and to provide a seamless support to meet the holistic needs of students and their families is now becoming more accepted. Such an approach, inter alia, is community-based, emphasises prevention rather than being crisis-oriented, is customer-driven rather than being focused on an agency, and is accountable through outcomes rather than inputs. For many, better co-ordination of services is seen as the only solution available which is commensurate with our present democratic societies.
All of the papers in this book were presented at a conference held in Toronto, Canada. They are original and have been written by policy-makers from different ministries, researchers from different disciplines and clients who come variously from Canada, Finland, France, Germany, the Netherlands, Spain, the United Kingdom and the United States.
(96 1998 07 1 P) ISBN 92-64-16966-0 216pp.
FF220 US$37 DM66 £23 ¥5250

Energy

Oil, Gas, Coal and Electricity Third Quarter 1998
Quarterly Statistics
January 1999
(60 1998 04 3 P) ISBN 92-64-05743-9 528pp.
FF600 US$100 DM180 £60 ¥14000

Natural Gas Distribution Study: Focus on Western Europe

December 1998

This study is the third and final part of a series of studies of the downstream gas supply chain (the first two parts, already published, are studies on Natural Gas Transportation and Natural Gas Security). The current volume is an in-depth analysis of natural gas distribution in selected IEA member countries with a focus on western Europe. The study examines market structures, regulation, company ownership, cost allocation, price setting and company profitability in gas distribution. It represents an invaluable resource for policymakers, companies and consultants seeking to gain an informed view of natural gas distribution in the context of regulatory reform and market opening.

(61 1998 19 1 P) ISBN 92-64-16182-1 300pp.
FF900 US$150 DM268 £92 ¥21050

Electricity Market Reform

February 1999

This booklet gives an introduction to the issues raised by regulatory reform of the electricity sector. The sector is undergoing change worldwide. A key objective of reform is to improve efficiency in order to reduce prices for electricity consumers. More competitive power markets are required to achieve this objective, but security of supply must also be sustained in the new conditions, and environmental objectives are of growing importance.

Ultimately, choices must be made by end-users themselves and not by others on their behalf. Hence, the structure of the industry needs to change to promote end-user choice, as do the regulatory institutions and rules that set the framework.

The contents of this volume were first published as part of an OECD book on regulatory reform in a variety of sectors. This updated version of the study is one in a series of short publications by the IEA on energy market reforms.

(61 1998 24 1 P) ISBN 92-64-16187-2 80pp.
FF295 US$50 DM88 £30 ¥7050

Regional Trends in Energy-Efficient, Coal-Fired, Power Generation Technologies

December 1998

In a world where energy market liberalisation and environmental concerns increasingly motivate the choice of electricity-generating technology, this study by the IEA's Coal Industry Advisory Board examines challenges to the greater market penetration of Clean Coal Technologies.

The study is based on regional surveys of the electricity industry in the major OECD coal producing and coal consuming regions and of the independent power producers who are developing projects in the non–OECD Asia/Pacific region. Key regional differences emerge: in the OECD region, with limited growth in electricity demand and deregulation of the electricity industry, the principal challenges are the availability of competitively-priced gas and the perception that clean coal technologies are more expensive or that their benefits have not been sufficiently demonstrated; in the non-OECD region, where most growth in electricity demand is expected, the major challenges are competitive and financial constraints on the independent power producers, together with the perceived higher operational risks of clean coal technologies.

This report concludes a series of publications on clean coal technologies. The first, Industry Attitudes to Combined Cycle Clean Coal Technologies, – Survey of Current Status, was published in 1994. This was followed by Industry Attitudes to Steam Cycle Clean Coal Technologies – Survey of Current Status, in 1995 and Factors Affecting the Take-up of Clean Coal Technologies – Overview Report, in 1996.

(61 1998 28 1 P) ISBN 92-64-16950-4 192pp.
FF295 US$50 DM88 £30 ¥7050

Natural Gas Pricing in Competitive Market

December 1998

The natural gas industry worldwide is facing fundamental change as a result of extensive reforms of regulatory systems, aimed at increased efficiency through competition. This restructuring, involving the sweeping away of many of the monopolistic features of the industry, is having a profound impact on the way gas is bought and sold, and on the underlying economics of gas price determination. This report aims to provide industry players and policy makers with an understanding of that process and of the critical factors in establishing an efficient, competitive market.

This analysis draws heavily on the experience of pioneering gas-sector reforms in North America, where the process began in the 1970s, and the United Kingdom, where reforms launched in the 1980s have gone furthest. Specific elements include: comparative assessment of the key features in, and approaches to, gas-sector regulation and reform; analysis of developments in gas pricing mechanisms and contractual arrangements; quantitative analysis of short-term price determination, including the role of interfuel and gas-versus-gas competition; assessment of actual experience with competitive markets in North America and the United Kingdom and their relevance to countries considering or embarking on gas sector reforms.

(61 1998 30 1 P) ISBN 92-64-16955-5 190pp.
FF660 US$110 DM197 £68 ¥15450

Energy Prices and Taxes

Third Quarter 1998

January 1999

(62 1999 01 1 P) ISBN 92-64-16196-1 524pp.
FF600 US$100 DM180 £60 ¥14000

Low-Level Radioactive Waste Repositories

An Analysis of Costs

February 1999

Low-level radioactive waste (LLW) arises in the normal operation of nuclear power plants and fuel cycle facilities, as well as from the use of radioactive isotopes in medicine, industry and agriculture. This report sets out the costs of operating disposal sites for LLW in OECD countries, as well as the factors that may affect the costs of sites being developed. This publication will be of special interest to experts in the field of radioactive waste management and economics of the nuclear fuel cycle.

(66 1999 03 1 P) ISBN 92-64-16154-6 180pp.
FF300 US$50 DM89 £31 ¥7000

Nuclear Law Bulletin

Supplement: Slovak Republic – Act on the Peaceful Use of Nuclear Energy (1 April 1998) No. 62

December 1998

(67 1998 02 1 P) ISBN 92-64-16975-X 36pp.

Nuclear Law Bulletin

December 1998, No. 62

December 1998

(67 1998 62 1 P) ISBN 92-64-15967-3 100pp.
FF170 US$33 DM50 £20 ¥3750

OECD Proceedings

Use of Hydrogeochemical Information in Testing Groundwater Flow Model

Radioactive Waste Management – Workshop Proceedings, Borgholm, Sweden, 1–3 September

January 1999

Site characterisation and evaluation are important elements for determining the site suitability and long-term safety of a geological repository for high-level and/or long-lived radioactive waste disposal. In that respect, matching the results of the various geoscientific methods used in site characterisation is important for building confidence in the data, concepts and models used for describing and understanding geological barriers of deep repository systems and assessing their performances.

As groundwater chemistry may provide a method to test site-specific, time-dependent groundwater flow models, a workshop on the 'Use of Hydrogeochemical Information in Testing Groundwater Flow Models' was hosted by the Swedish Nuclear Fuel and Waste Management Company (SKB) to assess the progress to date in this multidisciplinary aspect of site characterisation and evaluation. These proceedings include the papers presented at the workshop, as well as a technical summary of the topics addressed and the conclusions reached.

(66 1998 14 1 P) ISBN 92-64-16153-8 370pp.
FF550 US$91 DM164 £56 ¥12500

Financial, Fiscal and Enterprise Affairs

Financial Accounts of OECD Countries

FF80 US$14 DM24 £8 ¥2080

Germany 1982/1997

December 1998

(20 1998 25 3 P) ISBN 92-64-05834-6 44pp.

Belgium 1981/1996

December 1998

(20 1998 26 3 P) ISBN 92-64-05835-4 60pp.

Financial Accounts of OECD Countries provide flow-of-funds and balance-sheet accounts for most of the Member countries, detailed by sectors and by financial instruments. These accounts are integrated in an overall framework that is compatible with the concepts employed in the United Nations System of National Accounts. Annual data are published in booklets by country as soon as they are available.

Financial Market Trends 1998

No. 71

December 1998

(27 1998 03 1 P) ISBN 92-64-15956-8 202pp.
FF135 US$26 DM40 £16 ¥2900

Industry, Science and Technology

STI Review

Special issue on 'Public/Private Partnerships in Science and Technology' No. 23

February 1999

Public/private partnerships have become a cornerstone of science, technology and innovation policies in OECD countries as governments, universities and research institutes co-operate with industry to maximise benefits from R&D and technology. Partnerships are not cost free, however, and the mechanisms for successful partnerships vary greatly. What are the lessons from regional, national and international initiatives? Which types of public/private partnerships are most appropriate for which types of policy objectives? How can these partnerships build on existing structures to help firms, especially small and medium-sized enterprises, become more innovative? What are the most effective ways to finance them? Finally, how can public/private partnerships improve the commercialisation of public R&D?
(90 1998 23 1 P) ISBN 92-64-15977-0 268pp.
FF170 US$32 DM50 £20 ¥3600

Developments in Steelmaking Capacity of Non-OECD Countries
1999 Edition
February 1999
The Asian economic crisis has significantly reduced the development of steelmaking capacity in non–OECD countries; however, overall steelmaking capacity in the area is still expected to grow at an average annual rate of 6.2%, increasing by almost 60 million tonnes from the current 447 million tonnes, up to the year 2000.
The largest expansion is expected in South East Asia and in China, where nearly half of non-OECD steelmaking capacity exists. In some of the ASEAN countries and Chinese Taipei, new facilities are coming on stream that were planned during the boom period, although a number of them face delay, postponement or cancellation. During the last decade China has become one of the largest steelmaking countries of the world. In a recent move towards a market-oriented economy, however, greater emphasis has been placed on modernisation than on the pursuit of production volume.
Remarkable progress in steelmaking capacity is also expected in some Latin American and Middle Eastern countries. In contrast, most of the NIS republics and the central and eastern European countries are proceeding with the privatisation and modernisation of the industry, which is not likely to lead to an expansion of steelmaking capacity, but rather to the elimination of outdated and underutilised facilities.
(58 1999 02 3 P) ISBN 92-64-05841-9 260pp.
FF350 US$62 DM104 £37 ¥7850

Main Science and Technology Indicators 1998, No. 2
January 1999
(94 1998 02 3 P) ISBN 92-64-05745-5 88pp.
FF170 US$32 DM49 £20 ¥3600
Also available on Diskette

Iron and Steel Industry in 1997
1999 Edition
January 1999
(58 1999 01 3 P) ISBN 92-64-05837-0 52pp.
FF200 US$34 DM60 £21 ¥4750

Indicators of Industrial Activity
Fourth Quarter 1998
January 1999
(37 1998 04 3 P) ISBN 92-64-05735-8 130pp.
FF120 US$25 DM35 £14 ¥2550
Also available on Diskette

The Economic and Social Impact of Electronic Commerce
Preliminary Findings and Research Agenda
February 1999
Though only three years old, electronic commerce over the Internet has the potential to transform the marketplace. E-commerce will change the way business is conducted. Traditional intermediary functions will be replaced, new products and markets will be developed, and new relationships will be created between business and consumers. It will alter the way work is organised and open new channels of knowledge diffusion and human interactivity in the workplace. Workers will need to be more flexible as their functions and skills are redefined.
The changes e-commerce will bring are far-reaching. They require new frameworks for doing business and a re-examination of government policies relating to commerce and skills. What is electronic commerce? What is the current state and likely future direction of e-commerce? What are the drivers and what are the inhibitors? What is its impact on costs, prices, and ultimately on economic efficiency? How is it affecting intermediaries? How do firms compete in the electronic environment? What market structure is likely to emerge? What is the impact on jobs? What types of skills will be needed? What major societal transformations will it entail?
The full impact of e-commerce remains to be seen. This book begins to address these questions and provides a ground-breaking assessment of the economic and social impacts of electronic commerce and its effects on jobs by drawing on existing qualitative and quantitative evidence. This early analysis of an extremely dynamic activity identifies a number of areas where research is urgently needed and serves as the basis for an informed policy debate.
(93 1999 01 1 P) ISBN 92-64-16972-5 168pp.
FF135 US$22 DM40 £14 ¥3200

Labour Market and Social Issues

A Caring World
The New Social Policy Agenda
February 1999
A new vision of the purpose of social policy is needed. Scaremongers present decision-makers as facing an overwhelming number of complex problems with more and more limited budgets. Society is indeed undergoing profound upheaval. Ageing populations are increasing pressure on the workforce. Changes in the labour market have hit low-skilled workers hard; the term 'social exclusion' has entered the political lexicon, and policies can no longer be based on 'traditional' family life. But social policy should not be presented as 'papering over the cracks' in society caused by economic and demographic change. As knowledge plays an increasing role in generating wealth, empowering individuals to develop their potential is a central and essential part of economic policy. Indeed, economic and social policies are more intertwined than ever.
This book paints a complete and accessible picture of the current situation and pinpoints how policies can be reformed. Social policy should aim to promote employment and healthy living, rather than just coping with joblessness and ill-health. Investing in children and families helps ensure that all can contribute fully to society. Innovations and experiments in new social policies to better equip individuals and families with the support they need in responding to change abound in OECD countries. Ministers from OECD countries have committed themselves to the ambitious task of creating just such a caring world.
(81 1999 01 1 P) ISBN 92-64-17007-3 160pp.
FF120 US$21 DM36 £13 ¥2750

Labour Force Statistics 1977/1997
1998 Edition
February 1999
(30 1998 06 3 P) ISBN 92-64-05801-X 587pp.
FF595 US$98 DM178 £59 ¥12800

Quarterly Labour Force Statistics
Fourth Quarter 1998
January 1999
(35 1998 04 3 P) ISBN 92-64-05731-5 122pp.
FF90 US$18 DM29 £11 ¥1900
Also available on Diskette

Territorial Development

Micro-financing and Local Development
January 1999
(04 1998 06 3 P) ISBN 29-80-22085-X 190pp.
FF120 US$20 DM36 £12 ¥2850

Transport

Round Tables – ECMT

User Charges for Railway Infrastructure
No. 107
December 1998
Now that railway infrastructure and train operations have been separated in Europe – at least for accounting purposes – user charges for infrastructure are progressively being introduced to cover the costs of running trains. However, because of the lack of experience in this field, it is difficult to set the amount and choose the most appropriate form for these charges. There are in fact major differences between countries, and the objectives are many and sometimes conflicting. Given this situation, the Round Table sought to highlight, through its introductory reports and discussions, some essential economic principles that can help to shed light on what a rational system of user charges for railway infrastructure might be and thereby make it possible to address a crucial aspect of railway reform in Europe.
(75 1998 14 1 P) ISBN 92-82-11240-3 216pp.
FF290 US$50 DM86 £30 ¥6900

Indicators

databank

			% change from: previous period	% change from: previous year			current period	same period last year
Australia	Gross domestic product	Q3 98	1.0	5.0	Current balance	Q4 98	-4.97	-3.96
	Leading indicator	Dec. 98	0.9	1.8	Unemployment rate	Oct. 98	7.6	8.3
	Consumer price index	Q4 98	0.5	1.6	Interest rate	Jan. 99	4.79	4.99
Austria	Gross domestic product	Q4 95	0.0	..	Current balance	Dec. 98	0.35	0.67
	Leading indicator	Dec. 98	0.1	0.4	Unemployment rate	Jan. 99	4.4	4.4
	Consumer price index	Jan. 99	-0.1	0.5	Interest rate	Dec. 98	3.40	3.84
Belgium	Gross domestic product	Q3 98	0.3	2.5	Current balance	Q3 98	2.88	3.24
	Leading indicator	Jan. 99	0.2	-3.9	Unemployment rate	Jan. 99	8.4	8.9
	Consumer price index	Feb. 99	0.2	1.0	Interest rate	Dec. 98	3.30	3.64
Canada	Gross domestic product	Q4 98	1.1	2.8	Current balance	Q4 98	-2.51	-2.39
	Leading indicator	Dec. 98	0.7	1.6	Unemployment rate	Jan. 99	7.8	8.8
	Consumer price index	Jan. 99	0.2	0.6	Interest rate	Feb. 99	5.02	4.96
Czech Rep.	Gross domestic product	Q3 98	..	-2.9	Current balance	Q3 98	-0.02	-0.68
	Leading indicator		..	..	Unemployment rate	Jan. 99	7.2	5.0
	Consumer price index	Jan. 99	0.8	3.5	Interest rate	Feb. 99	8.18	15.92
Denmark	Gross domestic product	Q3 98	1.8	3.3	Current balance	Q4 97	-0.80	-0.91
	Leading indicator	Dec. 98	0.4	1.6	Unemployment rate	Dec. 98	4.6	5.4
	Consumer price index	Jan. 99	-0.1	1.7	Interest rate	Feb. 99	3.50	3.81
Finland	Gross domestic product	Q3 98	0.8	4.7	Current balance	Dec. 98	0.86	0.84
	Leading indicator	Oct. 98	-0.4	-7.9	Unemployment rate	Jan. 99	10.7	11.9
	Consumer price index	Jan. 99	-0.2	0.5	Interest rate	Dec. 98	3.37	3.60
France	Gross domestic product	Q4 98	0.7	2.8	Current balance	Nov. 98	3.24	1.84
	Leading indicator	Jan. 99	0.1	2.4	Unemployment rate	Jan. 99	11.6	12.1
	Consumer price index	Jan. 99	-0.3	0.4	Interest rate	Dec. 98	3.32	3.69
Germany	Gross domestic product	Q3 98	0.9	2.7	Current balance	Dec. 98	-0.55	5.73
	Leading indicator	Jan. 99	-0.1	-3.0	Unemployment rate	Jan. 99	9.1	9.8
	Consumer price index	Jan. 99	-0.1	0.4	Interest rate	Dec. 98	3.38	3.74
Greece	Gross domestic product	1997		3.2	Current balance	Mar. 98	-0.82	-0.75
	Leading indicator	Dec. 98	0.0	1.3	Unemployment rate		..	..
	Consumer price index	Jan. 99	-1.0	3.7	Interest rate	Jan. 99	9.50	12.40
Hungary	Gross domestic product	Q3 98	..	5.6*	Current balance	Jan. 99	-0.2*	-0.2*
	Leading indicator		..	..	Unemployment rate	Dec. 98	9.5	10.8
	Consumer price index	Dec. 98	0.3	10.3	Interest rate	Jan. 99	15.80	19.30
Iceland	Gross domestic product	1997		4.4	Current balance	Q3 98	-0.06	-0.03
	Leading indicator		..	..	Unemployment rate	Jan. 99	1.6	2.6
	Consumer price index	Feb. 99	-0.2	1.4	Interest rate	Jan. 99	7.64	7.30
Ireland	Gross domestic product	1997		10.6	Current balance	Q3 98	1.08	1.28
	Leading indicator	Oct. 98	-0.3	6.7	Unemployment rate	Jan. 99	7.2	8.6
	Consumer price index	Jan. 99	-0.8	1.5	Interest rate	Dec. 98	3.22	6.07
Italy	Gross domestic product	Q3 98	0.5	1.2	Current balance	Oct. 98	1.86	3.75
	Leading indicator	Jan. 99	1.3	0.8	Unemployment rate	Oct. 98	12.3	12.1
	Consumer price index	Dec. 98	0.0	1.5	Interest rate	Feb. 99	3.07	6.13
Japan	Gross domestic product	Q3 98	-0.7	-3.5	Current balance	Dec. 98	12.39	9.94
	Leading indicator	Dec. 98	1.5	1.3	Unemployment rate	Jan. 99	4.4	3.5
	Consumer price index	Jan. 99	-0.5	0.2	Interest rate	Jan. 99	0.69	0.95

			% change from: previous period	% change from: previous year			current period	same period last year
Korea	Gross domestic product	Q3 98	1.2	-6.8	Current balance	Nov. 98	3.33	0.86
	Leading indicator		..	..	Unemployment rate	Jan. 99	7.7	4.1
	Consumer price index	Feb. 99	0.4	0.2	Interest rate	Jan. 99	7.00	23.10
Luxembourg	Gross domestic product	1997		3.7	Current balance		..	..
	Leading indicator	Jan. 99	0.2	-4.0	Unemployment rate	Jan. 99	2.8	2.8
	Consumer price index	Jan. 99	-1.7	-1.4	Interest rate		..	..
Mexico	Gross domestic product	Q3 98	2.0	5.0	Current balance	Q3 98	-4.68	-2.55
	Leading indicator	Oct. 98	-5.7	-3.4	Unemployment rate	Dec. 98	3.1	3.4
	Consumer price index	Jan. 99	2.5	19.0	Interest rate	Jan. 99	31.97	19.37
Netherlands	Gross domestic product	Q4 98	1.3	3.3	Current balance	Q2 98	5.27	4.92
	Leading indicator	Dec. 98	0.6	0.7	Unemployment rate	Dec. 98	3.6	4.6
	Consumer price index	Jan. 99	0.1	2.2	Interest rate	Dec. 98	3.33	3.69
New Zealand	Gross domestic product	Q3 98	0.7	-1.3	Current balance	Q3 98	-1.20	-1.39
	Leading indicator		..	..	Unemployment rate	Q4 98	7.7	6.8
	Consumer price index	Q4 98	-0.8	0.4	Interest rate	Jan. 99	4.47	8.89
Norway	Gross domestic product	Q4 98	-0.6	0.2	Current balance	Q4 98	-1.53	1.37
	Leading indicator	Dec. 98	-0.2	-1.8	Unemployment rate	Q3 98	3.2	4.1
	Consumer price index	Jan. 99	0.4	2.3	Interest rate	Feb. 99	7.27	3.84
Poland	Gross domestic product		..	..	Current balance	Sep. 98	-1.29	-0.45
	Leading indicator		..	..	Unemployment rate	Jan. 99	11.1	10.4
	Consumer price index	Dec. 98	0.4	8.4	Interest rate	Jan. 99	13.58	23.31
Portugal	Gross domestic product	Q2 98	1.0	3.5	Current balance	Q4 97	-0.69	-0.87
	Leading indicator	Dec. 98	-3.7	-5.3	Unemployment rate	Jan. 99	4.3	5.9
	Consumer price index	Jan. 99	-0.3	2.7	Interest rate	Jan. 99	3.13	4.84
Spain	Gross domestic product	Q4 98	0.7	3.6	Current balance	Dec. 98	-2.62	-1.53
	Leading indicator	Dec. 98	1.2	2.9	Unemployment rate	Jan. 99	17.8	19.7
	Consumer price index	Jan. 99	0.4	1.5	Interest rate	Feb. 99	3.06	4.60
Sweden	Gross domestic product	Q3 98	-0.1	3.2	Current balance	Dec. 98	0.65	0.25
	Leading indicator	Dec. 98	-0.7	-1.6	Unemployment rate	Jan. 99	7.6	9.0
	Consumer price index	Jan. 99	0.0	-0.3	Interest rate	Feb. 99	3.14	4.33
Switzerland	Gross domestic product	Q3 98	0.4	1.8	Current balance	Q4 98	4.97	6.60
	Leading indicator	Jan. 99	0.0	0.4	Unemployment rate	Jan. 99	3.2	4.7
	Consumer price index	Jan. 99	0.2	0.1	Interest rate	Jan. 99	1.17	1.23
Turkey	Gross domestic product	Q3 98	-3.4	1.6	Current balance	Q3 98	1.79	0.94
	Leading indicator		..	..	Unemployment rate	Q4 98	6.2	6.9
	Consumer price index	Jan. 99	4.7	66.6	Interest rate	Jan. 99	78.88	72.78
United Kingdom	Gross domestic product	Q4 98	0.2	1.3	Current balance	Q3 98	3.77	3.14
	Leading indicator	Jan. 99	1.1	-1.4	Unemployment rate	Nov. 98	6.2	6.6
	Consumer price index	Jan. 99	-0.6	2.4	Interest rate	Feb. 99	5.42	7.45
United States	Gross domestic product	Q4 98	1.5	4.3	Current balance	Q3 98	-61.30	-38.09
	Leading indicator	Jan. 99	2.0	2.1	Unemployment rate	Jan. 99	4.3	4.6
	Consumer price index	Jan. 99	0.2	1.7	Interest rate	Feb. 99	4.90	5.54

Definitions and notes

Gross Domestic product: Volume series, seasonally adjusted except for Czech Republic and Portugal; ***Leading indicator:*** A composite indicator, based on other indicators of economic activity (employment, sales, income, etc.), which signals cyclical movements in industrial production from six to nine months in advance; ***Consumer price index:*** Measures changes in average retail prices of a fixed basket of goods and services; ***Current balance:*** $ billion; not seasonally adjusted except for Australia, the United Kingdom and the United States; ***Unemployment rate:*** % of civilian labour force – standardised unemployment rate; national definitions for Czech Republic, Iceland, Korea, Mexico, Poland, Switzerland and Turkey; seasonally adjusted apart from Turkey; ***Interest rate:*** Three months, except for Greece (twelve months) and Turkey (overnight interbank rate); .. *not available*

Sources: ***Main Economic Indicators***, OECD Publications, Paris, December 1998. For Hungary, PIB*: CSO and current balance*: Central Bank.

A wide range of tax burdens

There is a considerable range in OECD national tax levels, as tax revenues as a percentage of GDP show. The tax burden in 1996 exceeded 45% of GDP in five countries, all in Europe – Denmark, Sweden, Finland, Belgium and France. In contrast, five countries had tax levels below 30%: Mexico, Korea, Turkey, Japan and the United States. Mexico's total tax revenues were nearly 22 percentage points below the OECD average of 37.7%.

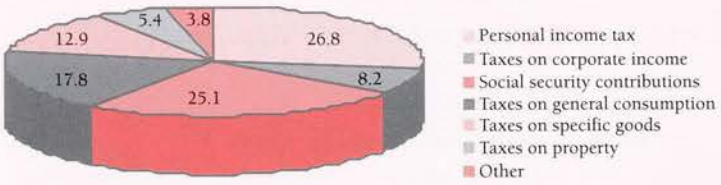
Total tax revenues, 1996
% of GDP

Source: OECD

Income taxes dominate the tax mix

Tax policy analysts look at the so-called *tax mix*, or the share of different taxes in total tax revenues. The tax mix collected for OECD countries taken as a whole is shown in the chart below. Although taxes on personal income and corporate income combined remain the largest source of revenue at 35% of total tax revenues, consumption taxes and social security contributions account for a sizeable share of the tax mix. The large share of consumption taxes – they account for 31% of total revenues – may be explained in part by growing difficulties encountered by authorities in taxing capital income. The non-negligible share of social security contributions (with 25% of total revenues) may be explained by the high level of spending on social schemes for the aged in OECD countries. ■

Tax revenue by main category, 1996[1]
% of total tax revenue



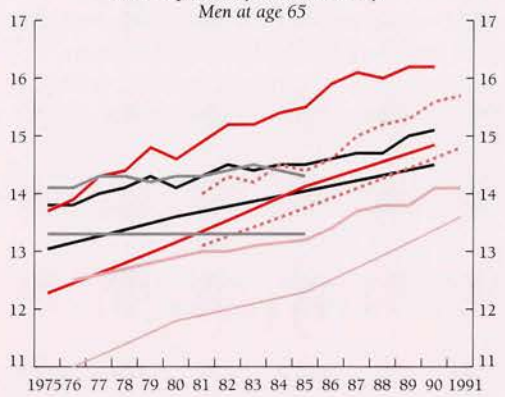
1. Total OECD area, unweighted average.
Source: OECD

Live longer, and better

In most OECD countries, people are living longer. Men, aged 65, are now expected to live 15 additional years and women, aged 65, are expected to live 18.7 more years. But policy-makers and health care analysts need to know if these extra years are spent in good or bad health. The answer is mostly good, or better

than before. To judge from the trends in severe disability across OECD countries, the gains in severe disability-free life expectancy have been mostly parallel to gains in life expectancy as normally defined. That means that more people are likely to grow old without suffering severe disability later on. ■

Life expectancy and disability[1]
Men at age 65



1. The upper line for each country indicates life expectancy; the lower line indicates disability-free life expectancy.

Source: OECD

Life expectancy and disability[1]
Women at age 65

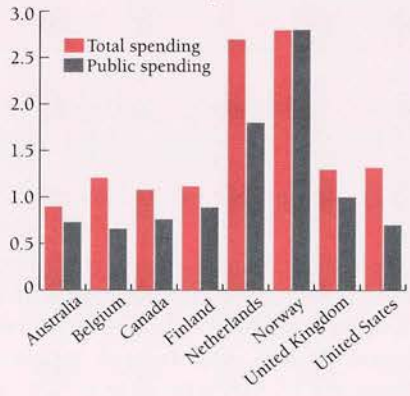
1. The upper line for each country indicates life expectancy; the lower line indicates disability-free life expectancy.

Source: OECD

The rising cost of long-term care

Spending on long-term care expenditure still represents a rather modest share of GDP – about 1–3% of GDP in most OECD countries. Long-term care expenditure represents approximately 10%–20% of health care expenditure, even more in Scandinavian countries This spending refers only to formal care, which accounts for only 20% of total care provided. The rest is provided by informal carers, mainly within the family. Again in Scandinavia this area of care is more developed than elsewhere. There was a marked increase in health care spending in most OECD countries from 1980 to 1995; in fact, the additional amount is equivalent to the total currently spent on long-term care.

Spending on long-term health care, 1992–95
% of GDP

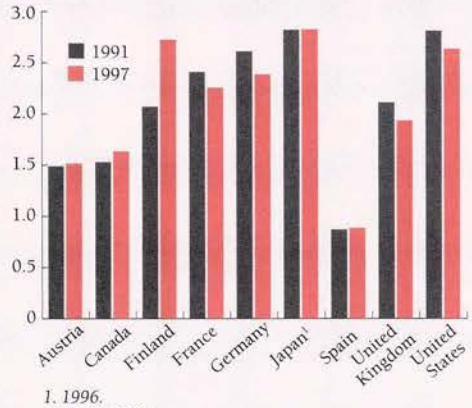


R&D spending

There are marked differences in the levels of spending on research and development (R&D) across OECD countries and the nine countries covered in the graph are representative of the range. The most accurate measure to use for comparisons is gross domestic spending on R&D as a proportion of GDP. Japan has the highest R&D spending, with 2.83% of GDP, followed by Finland and the United States. Austria, Canada and Spain spend less. From 1991 to 1997 most countries in the chart reduced their spending on R&D, notably France, down by 0.15 percentage points, Germany (down 0.22 points) and the United States (down 0.17 points).

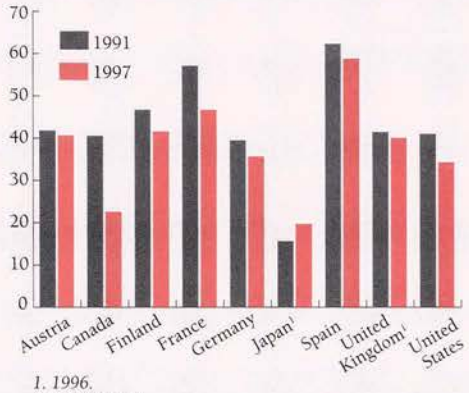
Governments R&D spending covers not only the public sector, but industry, education and private non-profit institutions as well. Spain may have the lowest overall R&D spending in the chart, but it has the highest proportion of government budgeted spending, with 58.9% of the country's total. In Japan, by contrast, most R&D spending is private-led, with only 19.85% coming out of government budgets. On the other hand, the Japanese government increased its budget for R&D spending over the 1991–97 period, by 5.2 percentage points, whereas the other countries in our chart saw their budgeted R&D spending fall. The sharpest cut was in Canada (-17.87 points).

Gross Domestic Expenditure on R&D
% of GDP



1. 1996.
Source: OECD

Government Budget Outlays for R&D
% of gross domestic expenditure on R&D



1. 1996.
Source: OECD

Declining trend in development assistance continues

The OECD's data bank on development, run by the Development Assistance Committee (DAC), shows that in 1997 total Official Development Assistance[1] (ODA) to developing countries and multilateral organisations amounted to $48 billion, or 0.22% of DAC Member countries GNP. This represents a fall of nearly 13% in current dollars and 5.8% in real terms compared with 1996. ODA has been on a declining trend for five years as countries have been squeezing their aid budgets. However, the drop in 1997 also reflects falls in exchange rates of national currencies against the US dollar. Another reason is technical, and reflects the transfer of seven countries from being classified as developing coun-

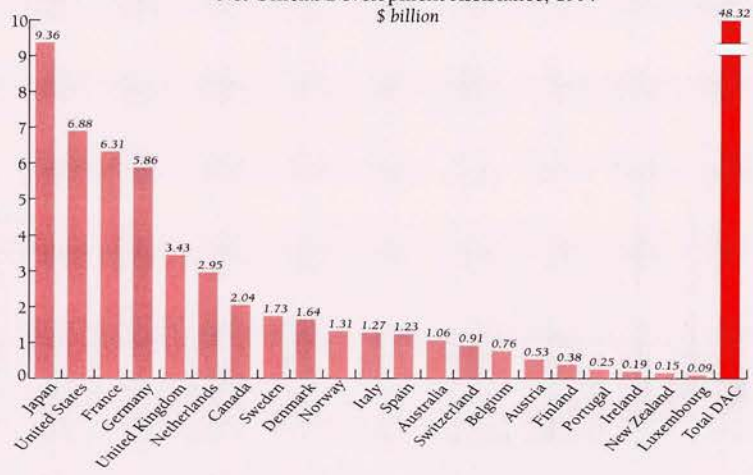
tries (Part I of the DAC List of Aid Recipients), to countries in transition (Part II of the DAC List of Aid Recipients). Israel, one of the largest aid recipients, was in this group. The aid it receives is now counted in the flows to Part II countries, called Official Aid, and is no longer ODA. (See also article by Yasmin Ahmad, page 46 of this issue.)

What is DAC aid?

Aid is defined as flows from the official sector of a donor country which have as their main objective the promotion of economic development and welfare of the recipient country and are given either as grants or concessional loans. In this case concessional means having a grant element of at least 25%, calculated at a 10% discount rate.

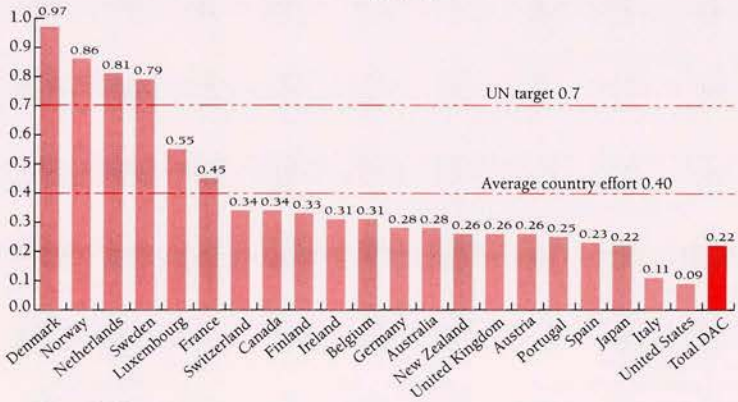
1. Aid flows are referred to as Official Development Assistance (ODA) if directed to a country on Part I of the DAC List of Aid Recipients, and Official Aid (OA) if directed to a country on Part II of the DAC List of Aid Recipients. For a details on the DAC List of Aid Recipients, see http://www.oecd.org/dac/.

Net Official Development Assistance, 1997
$ billion



Source: OECD

Net Official Development Assistance, 1997
% of GNP



Source: OECD