FOREST INDUSTRIES INTELLIGENCE LIMITED

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Rupert Oliver
rupert@forestindustries.info

VAT Registered No: 746311248 – Registrar of Companies for England and Wales Company No: 4689869

Head Office: The Little House▪ 18 Church Street▪Settle▪North Yorkshire ▪ BD24 9JE ▪ United Kingdom
Tel: +44 (0)7553 346410 / www.forestindustries.info

Technical Consultant to the AF&PA
Trade and Environment Programme in Europe

Technical Report for September 2000

Highlights and Commentary

This month's report highlights three issues:

- first, the limited amount of news now appearing within Europe of new adherents to WWF Buyers Groups. For the time being, membership of these groups appears to have plateaued in Europe after making rapid inroads into the retailing sector at the end of the 1990s. Much of the focus of the development of these groups now seems to focus on North America (with recent announcements from the likes of Lowes and 84Lumber), and possibly also in Japan and Brazil.

- second, the observation that lack of new development on the market side seems to have been replaced by a huge increase in activity on the supply side – illustrating the extent to which the whole certification issue is now driven by the forest products industry itself. Supply side activity in Europe is now dominated by developments within the Pan European Forest Certification (PEFC) scheme. Since the start of this year, 23 million hectares of European forests have been certified within the PEFC framework, and certification of many more areas is imminent. This month saw the issue of the first PEFC licenses for logo usage, opening the way for the marketing of PEFC labelled products. Meanwhile, new areas of FSC certification in Europe are now restricted to occasional areas of state forests, most recently 1 million hectares of forest managed by the Swedish National Property Board.

- third, while FSC progress seems to have slowed in Europe, there are signs that the organisation is beginning to make headway in the tropical Far East. Although there is little likelihood of large volumes of FSC certified wood from this region entering the market in the near future, significant steps towards the eventual development of fully operational FSC systems in Indonesia and Malaysia were taken during September. The Indonesian LEI scheme announced the development of a Joint Certification Protocol with the FSC, while the Malaysian National Timber Certification Council said they would be meeting FSC in December to discuss the establishment of a formal national FSC working group.

1 Meetings

1.1 UN ECE Timber Committee, Market Discussions Rome, 9/10 October

The UN ECE Timber Committee met in Rome during the week of 9 October. Relevant to forest certification, the meeting included:

- a report from the Confederation of European Paper Industries on their work to develop a comparative matrix of forest certification schemes. The matrix provides summary data of national and international forest certification schemes. It is designed to provide reliable information to customers and companies involved in the paper and wood products market on the status of individual certification schemes and possible labels issued under these schemes. A secondary aim is to inform the developing international debate on the harmonisation and mutual recognition of the wide variety of forest certification schemes currently under development worldwide. A first edition of the matrix was published in April 2000, and a second edition is to be published in November 2000 (available at www.cepi.org)

- a brief report from Jim Bourke the Timber Committee Secretariat on the direction of the certification debate. The Committee is playing a monitoring role, preparing annual reports on progress in certification in the ECE region – encompassing Europe, North America and Russia. A "Forest Certification Update for ECE Region" was distributed at the meeting. The following observations were made:
    - the potential supply of certified forest products is growing faster than market demand
    - market demand continues to be largely restricted to retailers, although there is an increasing view that certification has value as a marketing tool
    - Over 90% of the world's certified forests are in the ECE region and very few are in

    developing countries. The new PEFC may double the certified area of forest within 2 years.
    - Some forest lands are achieving multiple certifications and mutual recognition between certification schemes is being initiatied
    - the market statements issued by national delegations to the Timber Committee included only passing references to certification, and there is apparently very little information on the real market situation. Most suggest however that certified products have limited market share
    - a number of important questions remain unanswered including the true extent of demand for certified products; the current and potential future volume and value of certified products produced and sold; extent of consumer recognition for certified products; the effectiveness of certification in bringing about sustainable forestry; and the extent to which certification acts as a trade barrier.

- A report from Eric Boilley of the French timber trade association "Le Commerce du Bois" on their attitude to forest certification. The following observations were made:
    - at present no major French distributor has stated a strong preference for any forest certification scheme, whether PEFC, FSC or national schemes. Most remain open to acceptance of any credible certification scheme
    - French distributors attitudes to certification are being affected by the emergence of the Pan European Forest Certification Scheme. The first PEFC products from French forests should be on the market by the beginning of 2001.
    - A survey in 1998 by Le Commerce du Bois of 200 professional wood specifiers and 1000 consumers indicated environmental impact was much less significant than price and availability in their choice of building materials. However consumers generally preferred the "naturalness" of wood. Respondents also suggested that they may be willing to pay a 10% premium for certified wood – although in practice this may be more difficult to achieve.
    - Le Commerce du Bois supported the concept of mutual recognition between forest certification schemes as a way of minimising customer confusion and maximising the volume of certified wood supplied to the French market.
    - Le Commerce du Bois believe that certification will have a lasting role in the development of wood markets. In time forest certification will be an essential pre-requisite for market access in France.

1.2 Future meetings

A number of significant meetings will be held over the coming weeks:

- The International Forest Industry Roundtable (IFIR) are meeting in Australia 24 - 27 October to discuss the IFIR Working Group report finalised in June on the development of an "international mutual recognition framework system" for forest certification.
- A second international seminar on mutual recognition of forest certification schemes, to follow-up the first seminar arranged by the PEFC in June 2000, will held in Brussels on 29 November. The seminar is being hosted by the Confederation of European Paper Industries (CEPI).
- The FSC are holding their 2nd Annual Conference 9 -13 November. The focus of the meeting will be a discussion of three issues: indigenous people, community forestry, and workers' rights.

2 Development of certification in Europe

2.1 Pan European Forest Certification Scheme

2.1.1 PEFC certified forest area

At end September, the area of forest certified by PEFC endorsed schemes was as follows:

Scheme Endorsed by PEFCC	*Hectares Certified (Millions)*
Austrian Forest Certification Scheme	0
German Forest Certification Scheme	2.30
Finnish Forest Certification Scheme	15.00
Norwegian Living Forests Standards and Certification Scheme	5.00
Swedish Forest Certification Scheme	1.20
TOTAL	23.50

2.1.2 PEFC product labels on sale now

The PEFC Council has issued contracts and licences to national PEFC member organisations to allow them to issue sub-licences on behalf of PEFC in accordance with the organisation's logo usage rules. Under the procedures, each logo user is allocated a registration number to allow customers and members of the public to identify them and their chain of custody or forest management certificate. PEFC has developed a software program to allow pertinent details of licence holders to be placed on PEFC websites at national and international level.

The first PEFC logo usage licence was issued by PEFC Finland to the Pölkky Oy in early October. Pölkky Oy has a valid independently certified chain of custody, based on physical segregation, which verifies that its wood flows comprise only timber from PEFC certified forests and its products can now carry the PEFC logo to prove it. Pölkky Oy is a family company selling quality wood products. Other PEFC logo usage licences have been issued to:

- Metsälitto Osuuskunta, the parent company of the Metsälitto group, is a cooperative of 125,000 private Finnish owners which procures and markets wood to the Finnforest, Metsa-Botnia and Metsa-Serla mills. The groups deliveries of wood raw material totalled 23.1 million m3 in 1999.
- UPM-Kymmene Forest, the divsion responsible for supplying the mills of the UPM Kymmene Group with raw material comprising over 20 million m3 per year.
- Schauman Wood Company, which has a production capacity of 850,000 m3/year and is Europe's largest plywood producer. Schauman is part of UPM-Kymmene Wood products.

Other logo usage sub-licence are expected to be issued in Austria, Germany, Norway, and Sweden in the near future.

2.1.3 PEFC Chain of custody

According to PEFC rules, the use of the PEFC on-product label must be backed by an independently certified chain of custody. Concerns that this requirement may be difficult and costly for small to medium sized trading enterprises has led PEFC to look into the idea of "group chain of custody certification". PEFC reports that Austria is already developing these procedures at national level. The procedures involve random sampling inspections among participants in the group. So far pilot inspections of companies in different timber industry sectors have been carried out.

The Finnish consultancy, Indufor Oy, has also been commissioned to compare different chain of custody requirements under various certification schemes to provide input into the ongoing debate on mutual recognition.

2.1.4 PEFC in Poland

Poland is renowned for possessing the second largest area of FSC certified forest – after Sweden – in the world. Around 2.7 million hectares of Poland's state forests, equivalent to 30% of Poland's total forest area, have been certified to the FSC standard. However efforts are now underway to extend the PEFC certification system into Poland. PEFC is organising a seminar in conjunction with the Polish State Forestry Service to help the various stakeholders to develop their own national forestry standard and certification scheme. The seminar is part funded by the European Commission's General Directorate for the Environment. A range of speakers from countries in economic transition and from northern and central Europe will present their experiences of certification. The seminar will take place at the end of October at one of the Forestry Training Schools south of Warsaw.

2.1.5 PEFC UK

PEFC UK Ltd, an organisation developed under the leadership of private forest owners in the UK, has now applied to join the PEFC Council as a full member. The PEFC Board of Directors are recommending acceptance of the application and PEFC members will be asked to vote on it at the General Assembly in January.

2.1.6 PEFC Austria

No forests have yet been PEFC certified in Austria. However, a certification body is currently finalising its assessment of forest operations in the federal counties of Carinthia and Styria. About 11,500 forest owners manage the 550.000 hectares in this region, and certification is expected within the next few weeks. Other regions are expected to apply for certification over coming months.

2.1.7 PEFC Finland

On 25 September 2000, the region of Kainuu became the eigth Finnish region to be certified. Kainuu's 1.5 million hectares of certified forest took the total area in Finland to 15 million hectares. Forest audits are now underway in Finland's 5 remaining forest regions (Pohjois-Pohjanmaa, Pohjois-Savo, Häme-Uusimaa, Kymi and Rannikko) and these should be complete by the end of the year.

2.1.8 PEFC France

Official assessment of the French Forest Certification Scheme by the PEFC Council is expected to begin in November of this year. A preliminary application can already be seen on the PEFC web site. Additional elements (including a chain of custody) will be added before the application for full PEFC endorsement is complete.

2.1.9 PEFC Germany

So far 1.8 million hectares have been PEFC certified in the Thuringia, Baden-Württemberg and Bavaria regions of Germany. In addition to the state forests, around 400 forest owners in these regions have signed a voluntary self-commitment to PEFC certification and have paid the certification fee (0,10 Euro/ha). It is anticipated that by the end of the year a total of 3 million hectares and four further regions – Lower Saxonia, Brandenburg, Hesse and Rheinland-Pfalz – will be certified.

The Forestry Ministry of North-Rhine Westphalia has commissioned a project to compare implementation of PEFC and FSC in the field. The results are imminent. The decision of state forest departments in some regions on which scheme they will adopt hinges on the outcome of the study.

2.1.10 PEFC Norway

So far, 5 million hectares of forest have been certified in Norway. 4.9 million m3 of timber were harvested from these areas in 1999, around 64 % of the 7-8 million cubic metres harvested in Norway every year. The figure is expected to rise to 90 % by the end of the year.

In mid September, the Mjøsen district association of the Norwegian Forest Owners Federation was awarded an ISO 14001 certificate, basing their forest management on the 23 Living Forests Standards. Earlier in the summer, the district association of Glommen were also certified to the ISO 14001/Living Forests standard. The district association of Viken, whose certificate was suspended by the certifier Det Norske Veritas (DNV) earlier this year for failure to correct non-conformances, managed to regain their certificate during the summer.

Other existing Norwegian certificate holders are 3 district associations of the Norwegian Forest Owners Federation; the State-owned Land and Forestry Company; and two forest industry companies.

In an effort to discredit the Living Forest system, WWF Norway undertook their own log inventory controls and unannounced inspections in several forest locations in southern Norway over the summer months. WWF Norway claims to have discovered violations on the Living Forests Standards, especially relating to the Living Forests Standard on key habitats. The Norwegian Forest Owners Federation (NFOF) is disputing WWF Norway's claims. Further information on this issue can be obtained from http://www.skog.no/ and http://www.wwf.no/ or http://www.wwf.de

2.2 Swedish state forests FSC certified

WWF announced during September that one million hectares of Swedish state-owned forests have been FSC certified. This takes the percentage of Sweden's forested area certified by the FSC to 45%, the highest rate in the world. The newly certified area is managed by the Swedish National Property Board (SNPB) - the nation's land and buildings management authority. Sweden now has 10.2 million hectares of FSC-certified forest. All other areas of FSC certified forest in Sweden are industry owned.

2.3 Baltic states

Since the collapse of the USSR, the 3 newly independent Baltic states – Latvia, Estonia and Lithuania – have become increasingly important suppliers of forest products, notably sawn softwood, to the European Union. As such they have come under increasing pressure to develop forest certification schemes, both to satisfy demands for FSC certified wood from retailers principally in the UK, Germany and Holland, and also to ensure compatibility with the Pan European Forest Certification (PEFC) scheme. The development of certification in the Baltics is hindered by lack of financial resources. The situation is made more challenging by the huge changes in forest policy and regulatory frameworks resulting from the dismantling of the communist state controlled forest sector and the privatisation of large areas of forest land.

Nevertheless progress is being made. All three countries are developing new regulatory standards for sustainable forest management which they emphasise are designed to be compatible with both the FSC and PEFC schemes. In Latvia the State forestry sector initially took a keen interest in FSC certification, although efforts to develop a PEFC national program with greater involvement of the private sector have now been initiated. In Estonia, efforts to develop a national scheme linked to the FSC have been most prominent. A proposal to take the FSC Principles and Criteria as the basis for the Estonian national standard have been discussed and formal links with FSC are being established. Lithuania is lagging behind its neighbours.

However since the beginning of 2000, the Lithuanian state forest authorities and one particleboard manufacturer have been pushing for certification through the FSC framework. As a starting point, an effort is being made to obtain FSC certification for 70,000 hectares of state forest by the end of the year.

2.4 Ireland

A new Irish timber management regime has been launched that is hoped will underpin the country's fourfold growth in production by 2030. The Sustainable Forest Management programme was launched by Ireland's Department of Marine and Natural Resources during September. The initiative lays down minimum standards for wood production, biological diversity, carbon sequestration, the social function of forests and water quality. Three elements of the program include a National Forest Standard, a Code of Best Forest Practice and a Suite of Environmental Guidelines. The SFM will be policed by the Forest Service and the Forestry Inspectorate which will use grant aid to secure implementation. As a government initiative, the program does not have a direct link with voluntary private sector certification programs. However the Irish government suggest that the new program will provide a regulatory environment ensuring forest owners are well placed to go for third party certification. During the launch of the initiative, Ireland's natural resources minister reiterated his commitment to increase forest cover from the current level of 9% of land area to 17% by 2030.

3 Development of certification outside Europe

3.1 Indonesia

Since the onset of the Asian crises in November 1997, and the subsequent collapse of President Suharto's regime, Indonesia's forest sector has been experiencing a major upheaval. Under the terms of various economic restructuring programmes agreed with the IMF, the Indonesian government has been required to liberalise the wood industry, particularly to open up the nation's heavily protected plywood sector to foreign competition. At the same time, reports have emerged of immense levels of illegal logging, estimated to account for up to 50 million m3 per year – which compares to Indonesia's legal harvest of only around 25 million m3. Intense forest fires in 1998 and political uncertainty have added to the problems.

In response to the sector's problems and as a reaction to the mismanagement of the Suharto years, the new reforming Indonesian government has sought to restructure the whole system of forest concessions. The forest area allocated to large corporations is being reduced, while a greater role is envisaged for local communities and small enterprises. The Indonesian government is also promoting forest certification as one measure to encourage sustainable practices. The Indonesian government has indicated that it will provide incentives for the management of timber companies that have undergone certification through LEI, the Indonesian national forest certification scheme.

To date the LEI scheme, which has developed forest certification standards and procedures for indepedent forest auditing, has been operating on a pilot basis only. However a major move towards full operation was made mid September with the appointment by LEI of four companies to audit Indonesian forestry and issue certificates. The companies are PT TAV International Indonesia (a German joint venture), SGS International Certification Services Indonesia (Swiss joint venture), PT Superintending Company of Indonesia (Sucofindo), and PT Mutuagung Lestari.

Although LEI is an independent national forest certification scheme, it has carried out a continual dialogue with the Forest Stewardship Council. Last year it agreed a memorandum of understanding with FSC which, while falling short of a formal mutual recognition agreement, set out a range of activities on which they should cooperate. One outcome of the memorandum was announced in September 2000 with the publication of a Joint Certification Protocol (copy attached) between certification bodies accredited respectively by LEI and FSC. The Protocol, which is operational for one year, requires that:

- LEI and FSC accredited certifiers will work together at all stages of the certification process to gain experience of each others systems. A single team comprised of members of the two certification bodies will carry out the assessment.
- the criteria and indicators developed by LEI for certification will be used by all certification bodies in Indonesia.
- only forest units that pass both the LEI and FSC system requirements will be certified. The forest unit will recieve both an LEI and FSC certificate.

While concerted steps are being taken to develop certification in Indonesia, there is widespread recognition that the new system is no panacea for Indonesian forestry. Certification can only be effective in nations where a reliable forest policy and regulatory framework already exist. In Indonesia such a framework seems a long way off. At a recent international seminar in Indonesia to discuss the implementation of forest certification in Indonesia, Adi Warsita Adinegoro, the chairman of the Indonesian Forest Concessionaires, highlighted the many policy challenges facing the Indonesian wood sector before widespread adoption of forest certification can become a reality. He claimed that obtaining certificates from LEI is near impossible due to the continuing degradation of forest conditions in concession areas, mostly due to factors outside the concessionaires control. He noted that the government's failure to control rampant illegal logging and encroachment by local residents were among the problems hampering their efforts to adopt certification standards. Adi said that forest areas, including those held by concessionaires, have become subject to conflicts of land-use and ownership issues, as well as to encroachment and illegal logging. "Existing laws and government policies seem to have no power or capacity against such conflicts," he said. According to Adi, the certification standards imposed on timber companies to obtain the ecolabeling certificates by LEI are too strict and should be reviewed.

3.2 Malaysia

An article prepared by the German news agency Deutsche Presse-Agentur highlights recent developments in the Malaysian National Forest Certification Council (NTCC) scheme, including NTCC's attitude towards cooperation with the Forest Stewardship Council (FSC). In the article, Chew Lye Teng is quoted as acknowledging the marketing potential of FSC endorsement for the Malaysian scheme. He reported that Malaysia's timber authorities will meet with FSC officials in Kuala Lumpur in December, where they will discuss the setting up of a Malaysian national working group - one of the conditions demanded by the FSC. The article also points out that WWF already sit on the board of NTCC. According to Teng however "it'll be a long process before we can talk of FSC endorsement in Malaysia" as FSC would withhold approval unless all group members – including forest industry, environmentalists, social and indigenous interests - support Malaysia's certification standards.

Malaysia will be one of the first countries in Southeast Asia to try and set up an FSC-recognised national working group. At present the FSC is invited by individual timber firms in the region to certify selected forest plantations. In Malaysia's Sabah state, the FSC has endorsed products from the 55,000-hectare, state-owned Deramakot plantation under a programme partly funded by the German GTZ aid agency. Another plantation in Perak state is also in talks with the FSC. Malaysia has already in the past four years sold ”green” timber to the Netherlands, in a joint programme with the Keurhout Foundation, an independent Dutch timber verification body. The Netherlands is Malaysia's biggest European market and buyer of sawn timber, with import value last year up by 1.2 per cent to US$140 million. Malaysia orginally opted to work with Keurhout after its Dutch market plunged by a third in the mid-1990s partly as a result of environmental pressure.

The article notes that WWF is also trying to establish FSC-endorsed national working groups in Indonesia, Papua New Guinea, Cambodia and Vietnam.

3.3 Africa

At its annual meeting in Congo Brazzaville in early October, the African Timber Organisation agreed to support the development of a Pan African Certification Scheme. Ministers from 13 African countries, which together have tropical forests second only in size to the Amazon, approved a plan to set up a certification system designed to ”prevent the marginalisation of wood exports from Africa”. However members of the Organisation acknowledged that developing a single scheme accomodating the huge diversity of African forests, ownership structures and regulatory environments would be ”complicated”. According to ATO, the first and most challenging stage will be to agree on criteria for certification.

3.4 Canada

Canfor Corporation announced in September the certification of approximately 1.5 million hectares of forest lands under the Canadian Standard Association's (CSA) scheme. This represents the first CSA certification for Canfor and the largest, by area, in Canada. The areas certified to the CSA SFM System Standard were Canfor's Forest Management Agreement area in Grande Prairie, Alberta and Tree Farm Licences in Chetwynd and Englewood, British Columbia. These certifications were received after an independent audit by KPMG Quality Registrar Inc. Canfor is also pursuing Forest Stewardship Council (FSC) certification for its area-based tenures in British Columbia and Alberta.

4. Market Developments

4.1 Holland

Researchers appointed by the Foundation Good Wood (FGW) in the Netherlands report that in 1999, 327,000m3 of FSC-certified timber were sold on the Dutch market. This represents around 4% of total timber consumption. In addition, around 100,000 pieces of FSC-certified garden furniture were imported. FGW, a collaborative of FSC-certified forest owners, timber importers, retailers and conservation organisations, has set a target of ensuring 50% of total Dutch consumption is FSC certified by 2006.

Meanwhile Holland's green party has again succeeded to pursuading the nation's lower house of parliament to endorse draft legislation that would require mandatory labelling of wood products as from either sustainable or non-sustainable sources. The draft legislation must again be sent to the European Commission to ensure it does not conflict with EU free trade and competition law. A previous attempt by the Dutch Lower House to introduce a similar law in 1998 was rejected by the EC as being potentially discriminatory. The new draft legislation is expected to be rejected on similar grounds.

4.2 Poland

Two of Eastern Europe's largest wood based panels plants - Kronospan and Kronowood in Poland - have been awarded FSC Chain-of-Custody certificates. The mills have an annual capacity of 600,000 m^3 particle boards and 650,000 m^3 fibre boards and are significant suppliers to the furniture industry and do-it-yourself sector in Western Europe, notably Germany. In addition to particle boards and mid and high density fibre boards, the Kronospan Group Poland will from now on produce interior panelling, ceiling panels, window sills, work surfaces and strips out of FSC certified timber.

4.3 UK Railtrack

Railtrack, the privatised utility that manages the UK's rail network, began installation in September of the first ever delivery of FSC endorsed railway sleepers on the United Kingdom rail network. Railtrack has pledged to buy only timber products from sources independently certified to FSC standards by the middle of 2001. The company is a long-standing member of the WWF 95+ Group. A total of around 1,500 FSC endorsed hardwood (Karri) sleepers have been bought from South Africa, Guatemala and Brazil and used in London, Euston and South East area. Each year Railtrack's contractors buy 120,000 softwood sleepers (Douglas Fir, Scots Pine, Maritime Pine) from France and 40,000 hardwood sleepers (Karri, Ironwood) from South Africa, Guatemala and Brazil.

5. Environmental issues

September was a relatively quiet month in Europe for environmental campaigning related specifically to the forest products trade. This may reflect environmentalists' preoccupation with renewed demonstrations against global capitalism at the annual meetings of the IMF and World bank at the end of September.

However, in a rerun of earlier European campaigns, importers in the United States itself have been subject to renewed criticism for their rising level of mahogany import from South America. The source of the criticism is a new report from TRAFFIC, the wildlife trade monitoring program of World Wildlife Fund and IUCN - The World Conservation Union – which suggests that the U.S. now accounts for 60% of the global mahogany trade. According to the report, the equivalent of about 57,000 American mahogany trees was harvested and shipped to the U.S. to supply a robust business in mahogany furniture. The report, "Mahogany Matters: The U.S. Market for Big-Leafed Mahogany and its Implications for the Conservation of the Species," includes an analysis of global trade data -- both published and unpublished -- along with a survey of US mahogany importers. The authors of the report suggest that the scale of the trade is threatening the economic viability of the species. The solutions proposed include increased realisation on FSC certified stock, reconsideration of listing the species on Appendix II of CITES; and a proposal that the U.S. government should increase import tariffs on minimally processed mahogany from Latin America (they are currently exempt), while lowering or waiving duties on products of non-threatened tree species.

At policy level, environmental groups have also been active in their efforts to undermine attempts to use forest plantations as one mechanism for countries to meet the goals of the Kyoto protocol. Under the Protocol, an agreement signed by more than 100 countries in 1997 but not yet been ratified, countries would be required to reduce overall emissions of greenhouse gases by at least 5% below 1990 levels in the commitment period 2008 to 2012. Several countries, including the United States, Canada, Russia, have been pressing to achieve a significant proportion of greenhouse gas reductions not at source but by using "sinks" like forests to remove carbon dioxide. However environmental groups have latched on to recent studies which seem to cast doubt on the science behind the carbon sink concept. One such study was carried out by Dr. Ernst-Detlef Schulze of the Max Planck Institute for Biogeochemistry in Germany and published in the journal Science during September. It suggests that ”old growth” forests hold so much carbon – much of it tied up in the soil – that it would take centuries for newly planted trees to build up an equivalent reservoir. According to environmentalists, the implication is that old growth protection should be given much greater emphasis in the Protocol than the establishment of new plantations.

Another study being used by environmentalists to cast doubt on the sink idea has been released by the International Institute for Applied Systems Analysis (IIASA). The study, entitled Full Carbon Account for Russia, suggests that the benefits of sinks cannot be accurately measured. Using Russia as a test case, IIASA suggest that a full carbon accounting (FCA) for a country requires not only highly detailed studies of complex natural and anthropogenic processes and their interactions, but also identification and quantification of the associated uncertainties. IIASA found that the uncertainty range for the estimated total carbon balance in Russia in 1990 amounts to about 129%, and that any improvement in this balance resulting from tree planting falls completely within this assessed uncertainty range. Therefore the uncertainties of the accounts dwarf the changes in the total carbon balance possible with the 4 year Kyoto compliance period.

Rupert Oliver
AF&PA Technical Consultant
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