Attempts to extend the life of coconut leaf thatch have been going on for over a decade in several laboratories across the world. At least nine methods have emerged for extending thatch life and 12 chemical treatments have been suggested for making it fireproof. Pillai says the chemicals used so far are either costly or a health hazard or leached by rain. The RRL recipe is claimed to be cheap, safe and nonleachable.

As well as India, the RRL process may benefit Sri Lanka and the Polynesian islands where coconut leaf is the main roofing material in rural homes. Longer life for thatched roofs would result in surplus coconut leaves which, according to RRL, could be used to make newer products. Pillai and his team have already made brown paper from the pulp of the leaves, and laminated products such as table tops and door panels directly from the leaves. "The laminates are made by plaiting the leaflets into sheets and using these sheets as plys as in the case of plywood", says Pillai.

K.S. Jayaraman

US biological weapons

Protests over US Army lab

Washington

THE latest attempts by lobbying groups to persuade Congress to regulate the military use of biological research has centred on the US Army's "aerosol test facility" at Dugway, Utah.

Fourteen groups, coordinated by the Committee for Responsible Genetics, are seeking a ban on all classified research and development "aimed at producing new or altered biological agents with properties useful for biological and chemical warfare". They also want an investigation into allegations that the Soviet Union and its allies are developing biological weapons, incorporation of the 1972 Biological Weapons Convention into US domestic law and a complete halt to the proposed aerosol testing facility.

Congress has approved a \$300 million modernization of the Dugway Proving Ground, the Army's primary test site for biological and chemical research. However, the controversial part of the project is the proposed special testing laboratory for handling "toxic biological aerosol agents", and construction of the laboratory has been delayed by a court injunction which will remain in force until the Army produces an "adequate" environmental assessment.

The Army has responded by stating that it will prepare an "environmental impact statement", a much more detailed study than required by law, and will contract out the work to an independent organization in an attempt to avoid suggestions of bias. An Army spokesman stressed that the

Acid rain

Upwind versus downwind

LESS affected countries relegate acid rain issues to faraway forests: those more affected have so far failed to implement a policy designed to handle the chemical complexity and long-term effects of acid pollution. By drawing together worldwide data on the problem, a report published this week by the environmental pressure group Earthscan tries to bring the problem closer to home. It argues that acid pollution is rapidly spreading to the Third World, that downwind countries will place increasing pressure on upwind pollution sources, and that buildings and crops are as much damaged as trees and fish.

These data, according to the report, widen the scope of acid pollution. Not all acid deposition is wet, for example; one-third of sulphur emissions in the north-eastern United States is thought to be dry deposited, converted to acid on the surfaces of plants and buildings. Not all acid deposition is sulphur dioxide from fuel-burning plants; nitrogen oxide and ozone are among the culprits, and cars and fertilizers as much a problem as smoke stacks. Among the less industrialized countries, China faces the greatest risks, especially from inefficient combustion of low-quality coals; and Brazil, says the report, is one of the most polluted countries on Earth.

"Downwind countries like Norway, Sweden, Canada and Germany are simply not prepared to have their environment destroyed from abroad. There is already serious talk in Sweden of taking Britain to the International Court and in Norway of offering loans to Britain and Poland to finance anti-pollution measures at our power stations", says Jon Tinker, director of Earthscan.

The effects of acid pollution on trees and lakes have excited the most research, but the tangle of cause and effect has led to disagreement about the impact on the en-

vironment of such pollution. Last week, for example, Dr David Lonsdale, the plant pathologist of the Forestry Commission, claimed that the damage to Britain's beech woods was not caused by acid pollution. Resort areas dependent on their trees, however, such as West Germany's Black Forest, claim that there is enough evidence to justify governmental action.

The damage goes deeper than leaves on trees, according to the Earthscan report. As chemicals wash through the ground, the soil becomes more acidic. Soil under ice during the last Ice Age, including those in South America, Africa and southern Asia, are young in age and have less buffering capacity. Aluminium is a key prob-

lem. Normally tied to soil particles, chemical combination frees aluminium to damage root filaments and enter freshwater, where it has proven toxic throughout food chains. Lakes can be limed, but there are no data on how to treat soils, nor on how long they take to recover.

Elizabeth Collins

Acid Earth, by John McCormick, is published by International Institute for Environment and Development, London, and costs £3.95/\$6.25.

Dugway programme is "entirely defensive in orientation" and that there is no development of "delivery mechanisms" for biological agents planned anywhere in the Army's research programme.

Environmental and other organizations, however, fear that military biological research signals a "new spiral in the arms race". The validity of "defensive" biological research is questioned.

"Given the enormous natural variety of potentially infectious agents, together with the extraordinarily increased variation and novelty that genetic engineering technology provides, it is not possible to protect a population against biological warfare" Dr Jonathan King, professor of molecular biology at the Massachusetts Institute of Technology, told congressional representatives. And Dr Francis Boyle, professor of law at the University of Illinois, challenged the "Reagan administra-

tion's ... claims that the Soviets cannot be trusted with respect to the conclusion of future chemical and biological arms control agreements".

Dr Boyle argued that, in the absence of evidence for violations of biological weapons agreements, there is no need to support "recombinant DNA biological warfare research in the USA", although he recommended that Congress should "continue to monitor" the situation, as well as improving existing treaty arrangements.

Although the Army says that most of its evidence for Soviet involvement in biological warfare research comes from intelligence sources, one much-quoted example is the possible use of mycotoxins in "yellow rain" in South-East Asia. The Army refused to confirm or deny that mycotoxins would be used at Dugway.

Maxine Clarke