



The Coffee Rust Problem in Papua New Guinea

Summary of D.E. Shaw, R.M. Bourke, S.C. Bell and B.D. Shaw,
'Implications of the 1986 outbreak of coffee rust in Papua New Guinea',
NCDS, Islands/Australia Working Paper No. 86/15.

Coffee in the national and the regional economy

It is estimated that some 270,000 village households are involved in coffee production in Papua New Guinea. It is the third most important village activity after food crops and pigs. Seventy-five per cent of Papua New Guinea's coffee comes from smallholders. Around 1 million people (one-third of the population), directly or indirectly, derive an income from coffee. It is the principal source of cash income in the Western Highlands, Eastern Highlands and Chimbu provinces which account for 85 per cent of total production. The cash income generated by coffee has greatly improved standards of living in these areas, notably through better nutrition.

Coffee typically earns 40 per cent of **agricultural** export receipts in Papua New Guinea, and over 13 per cent of **total** export receipts. It is also estimated that the industry generates around 10 per cent of domestically generated government revenue.

Coffee rust

Coffee rust is the worst disease of coffee and one of the worst plant diseases in the world. The recent outbreak in Papua New Guinea was first reported in late April 1986, and it has spread quite widely since then. Coffee rust is a fungus

that manifests itself as yellow spots on the under surface of coffee leaves. It mainly affects the high quality, high price Arabica coffee. Infected coffee leaves fall prematurely causing defoliation of the coffee bush that can severely reduce the development of the succeeding year's crop of cherries. Ultimately it can destroy the trees. The fungus spores spread easily and quickly, affecting wild, self-sown coffee, so that rust becomes extremely costly to eradicate.

Coffee rust is widespread in the major coffee-growing countries of the world, but Papua New Guinea was free from the disease until the recent outbreak. Experience of the disease in other countries has differed widely. In Sri Lanka, the first country to be seriously affected (in 1869), coffee was completely wiped out. The industry suffered a similar fate in Indonesia and the Philippines. In other countries such as Kenya and the coffee-growing countries of South America, control of the disease has been made possible by careful spraying regimes and the development of rust-resistant varieties that generally draw on Robusta coffee's resistance to rust.

The fungus can be spread by windborne spores or can be carried on persons, clothing and goods, as well as on machines. It is most likely that the fungus entered Papua New Guinea on someone who had been in contact with the disease in an infected country.

Coffee rust can be combated in four major ways. These include:

1. **Eradication — by the total destruction of all infected coffee.** This was undertaken by the colonial government in a previous outbreak near Port Moresby. The widespread nature of the present infections, their location in the main coffee growing region and their occurrence mainly in smallholder coffee, would necessitate an eradication campaign of enormous proportions, of long duration and of doubtful success.
2. **Killing the tops of the coffee bushes while keeping the stumps alive.** This method was successfully used in Nicaragua for several years. However, conditions there were very different from those currently existing in mainly smallholder coffee lots in Papua New Guinea. Reinfection is highly likely to occur from self-sown coffee. The disadvantages of this method are likely to outweigh the advantages in the Papua New Guinea situation.
3. **Chemical control by fungicides.** If the above two methods are not used then control of the fungus by chemicals will be necessary if the Papua New Guinea coffee industry is to survive. It will be necessary to undertake widespread and continuous trials into types of fungicides to be applied, their concentrations, volumes per leaf, number and timing of applications and the possible toxic effects on the plant, the soil and coffee.
4. **The breeding of resistant coffee varieties** is a necessary concomitant to chemical control. However, it is costly and difficult, for the fungus can mutate and attack previously resistant varieties.

Actions (3) and (4) are likely to be most successful. Unless these activities are undertaken immediately and on an appropriate scale, there will be serious crop losses from 1987 onwards.

Implications of coffee rust for Papua New Guinea

If the outbreak of coffee rust is not controlled it will shortly start to reduce standards of living in the Highlands. Apart from the effect on the income of smallholders, government revenues would decline and the balance of payments would deteriorate. Up to a point, employment would be held up by the need for spraying, but, if control were neglected, this demand for labour would decline.

Costs of production for coffee will increase with the necessity to apply fungicide sprays. This is likely to be a problem initially for smallholder coffee producers who, in the almost complete absence of coffee improvement through extension work, have not been used to spending money on inputs into their coffee production.

Despite the beginning of production declines, 1986, and possibly 1987, still appear to be good years for the coffee industry in Papua New Guinea. Coffee prices have almost doubled since last year, and exports of coffee are likely to be substantially higher in 1987 than expected. The International Coffee Organisation has removed its export quotas following the news of the Brazilian drought. From 1988, however, the effects could be serious — depending upon the timing and the severity of the disease.

It is important that the government should plan immediately to ensure that the next two years provide for the future when the effects of the rust will be more severely felt.

The immediate introduction of a 'rust tax' to help defray the public component of a chemical control program would be a step in the right direction. Extension services will be necessary for the smallholders, and the plantations too will have to become accustomed to higher production costs than previously.

Conclusions

In summary:

1. The coffee industry is likely to be devastated by rust unless there is an effective control program.
2. Whatever the outcome, the national, regional and local economic and social consequences will be considerable. Most growers will have to face increases in costs and falls in yield. Employment and incomes will be affected.
3. Eradication of coffee rust by destroying all trees, including wild ones, does not seem economically, socially or politically possible.
4. The replacement of existing bushes by rust-resistant varieties is possible, but only after many years of experimentation and multiplication of stock. Even then, rust resistance cannot be guaranteed.
5. The ultimate outcome of the introduction of coffee rust to Papua New Guinea depends on the speed and appropriateness of the reaction of government, the industry and the growers.

External assistance may be required to help fly in supplies, provide equipment and facilitate liaison with manufacturers and agents where necessary. Scientific support may be useful for the Coffee Industry Board's new research institute. Australian scientists could help with multiplication of rust-resistant varieties, but most of the research that needs to be done must be done in Papua New Guinea.

External support needs to be timely, focused and effective, with an appropriate mix to address short-term immediate problems as well as longer-term solutions.