



Australian Government  
Australian Centre for  
International Agricultural Research

# Final report

*project*

## **Trade liberalisation, agriculture and land degradation in Fiji: implications for sustainable development policies**

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*project number* ADP/2002/047

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*date published* August 2009

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*Final report number* FR2009-37

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*ISBN* 978 1 921615 35 1

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*published by*

ACIAR  
GPO Box 1571  
Canberra ACT 2601  
Australia

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## 1 Acknowledgments

The authors gratefully acknowledge the financial support provided by ACIAR to facilitate this project. We are also grateful for the invaluable in-kind support provided by the Australian and Fijian participating institutions which contributed immensely to the successful completion of this project. Special mention goes to the secretarial staff of the School of Economics at USP who assisted with the logistics and organisation of the final workshop. We also acknowledge the contributions made to the project by the staff of the Ministry of Agriculture, in particular those based at Nadi for organising the logistics and execution of the field surveys. Special mention goes to Mr Osea Bolawaqatubu and Mr Atish Prasad.

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## 2 Executive summary

The overall goal of this project is to empirically assess the economic and environmental impacts of agricultural trade liberalisation on the economy, as well as the environmental effects of increased agricultural production and trade. The specific objectives are to

- assess the impact of trade liberalisation policies on agricultural production, the economy and the environment, with particular emphasis on land degradation
- critically review the institutional framework required to make trade, environment and agricultural policies more effective as drivers of sustainable development
- collaborate with and build the capacity of the National Planning Office (NPO), the Ministry of Agriculture, and the University of South Pacific (USP)
- communicate the findings to the stakeholders and the academic community through technical and non-technical publications

Given the complex interactions within various sectors of the economy, as well as between the economy and the environment, a computable general equilibrium (CGE) approach was adopted for investigating the impacts of agricultural trade liberalisation. This was supplemented with a series of partial equilibrium (econometric) studies. Given that the environment is a rather broad construct, the investigation of environmental effects in this study was limited to land degradation, in particular soil erosion.

The main findings are as follows:

### *Land degradation*

- In this project, the first attempt was made to quantify the economic cost of soil degradation to cane farmers and the sugar industry. The cost of soil erosion to farmers is estimated to be about US\$8 million per annum, while the industry loses about US\$12 million in sugar sales per annum.
- Despite the high economic cost of land degradation to farmers and the significant external costs it imposes on society in general, soil conservation is very low on the government's policy agenda.
- At the institutional level, there is weakness in implementing and enforcing environmental legislation. At the farm level, there is lack of government support for education and extension services.
- Sugar production is not the only area where land degradation is a problem. For example, soil erosion is also high in the cultivation of ginger. Therefore, there is a need to take a comprehensive look at the issue of land degradation and to institute policies to address the problem.

### *Trade liberalisation*

- We analysed and compared various trade liberalisation scenarios beginning with unilateral trade liberalisation by Fiji, different types of regional trade agreements (RTAs), global trade liberalisation, as well as various options for structural reform of the Fiji economy.
- While various RTAs could yield some overall benefits, the best outcome for Fiji is global trade liberalisation involving removal of tariff and non-tariff barriers between the developed and developing countries.
- To successfully meet the impending challenges brought on by trade liberalisation, Fiji would need to restructure its agriculture sector (in particular the sugar sector) and expand its export base.
- Targeting a particular sector for growth is likely to have adverse impacts on other sectors. Therefore, broad diversification of the economy would deliver the best outcomes for the economy.
- For this to be possible there is a need to address the institutional and structural constraints that inhibit producers' ability to react to favourable market conditions.

The key policy recommendations arising from the study are as follows:

- There is a need for the government to take a comprehensive look at the issue of land degradation and to institute policies to address the problem.
- We advocate increased government expenditure to improve public education and awareness about land degradation.
- There appears to be lack of awareness in the general community about the effects of trade liberalisation. Information put out in the local media by anti-trade organisations show trade liberalisation to have adverse effects on the economy. However, our research indicates that the net benefits can be positive. There is therefore a need for more public education on this issue.
- There is a need for the government to harness both internal and external resources to address structural and institutional constraints such as poorly developed transport and telecommunications infrastructure, inadequate ports and handling facilities, tedious customs procedures, lack of marketing networks, lack of knowledge about standards, lack of microfinance programs, and poor functioning of markets for leasehold land.
- There is a need for the government to invest in human capital development with specific emphasis on low and middle level skills training.

Based on feedback received from workshop participants and on our own observations in the course of conducting this research, the ability of government agencies to conduct policy analysis is vital to effective decision making. However, this is one area where capacity is grossly lacking even in a country like Fiji where educational levels are relatively high compared to other Pacific Island Countries. Therefore, there is a need for more initiatives such as this one to build capacity within government agencies.

The modeling approach used in this study could be extended in the future to further investigate the links between the economy, the environment and poverty, which could further enhance our understanding of these complex relationships and help to propose more effective poverty alleviation programs.

### 3 Background

Fiji is a relatively small Pacific Island country with a population of 824,000. The Fiji Islands comprise some 300 islands covering a land area of approximately 18,400 km<sup>2</sup>. The two largest islands, Viti Levu and Vanua Levu, make up 88% of the land area. Approximately 16% of the land is suitable for arable agriculture, and an additional 43% can be used for tree cropping and grazing. For many decades agriculture in Fiji has been the major contributor to gross domestic product (GDP) and exports. In 1994, agriculture's share of total exports was 60%, while its share of GDP was 18%. However, agriculture's contribution to GDP and exports is on the decline, having now been overtaken by tourism and textiles. The tourism sector alone currently contributes about 20% of GDP, while agriculture's share is approximately 15%. Nevertheless, agriculture remains the main source of employment. Sugar production and subsistence farming are the dominant activities in this sector, with the former providing employment for more than 25% of the workforce (Kumar and Prasad, 2002). Although there is a reasonable level of public awareness about environmental issues in Fiji, recent evidence suggests the problem of land degradation is worsening. Soil loss measurements by the Fiji Ministry of Agriculture, Sugar, and Land Resettlement indicate that the agricultural productive base in many sugarcane areas is declining at a rate well above what would be regarded as economically acceptable (Leslie and Ratukalou, 2002). The main form of land degradation is soil degradation, which occurs from widespread and indiscriminate burning - particularly, but not exclusively, in the sugarcane growing areas.

Other causes of soil degradation include deforestation, overgrazing, and expansion of sugarcane and other crops (e.g. dalo and yagona) on to marginal land (e.g. steep slopes). In a review of a variety of catchments in both the western (dry) and eastern (wet) side of Viti Levu, the IUCN estimated soil loss to be between 24 and 79 tons per hectare per annum, which is equivalent to a topsoil loss of 1.6-5.3mm per annum (IUCN, 1992). Other forms of land degradation include excessive pesticide and fertilizer use in taro and vegetable farming. A serious consequence of land degradation is that the impacts from natural disasters are becoming increasingly more acute, in particular, vulnerability to droughts and flooding. The cost of these natural disasters is conservatively estimated at an average of F\$20 million per annum (Swami, 2004). The social costs are even greater when one considers the reduction in rural incomes and increase in rural unemployment as a result of these climatic events.

Since the 1986, Fiji has been gradually liberalising its economy with the deregulation of the agricultural sector and a switch from import substitution to export promotion. Fiji is a signatory to the Pacific Island Countries Trade Agreement (PICTA), which took effect from January 1, 2006. Under this agreement the Pacific Islands Countries who have signed will undertake tariff removals for trade amongst them. With the expiration of the Cotonou Agreement at the end of December 2007 and phased removal of Fiji's sugar subsidies, Fiji has signed an interim Economic Partnership Agreement (EPA) with the European Union (EU) for goods trade. Under the EPA, the EU will liberalise (i.e. remove duties and quotas) 100% liberalisation by value of its imports as of 1 January 2008 (with transition periods for rice and sugar). On its part, Fiji will remove tariffs on 80% by value of imports from the EU over a period extending from 2008 to 2020. These agreements may be seen as precursors to eventual global trade liberalisation when worldwide trade will be fully liberalise.

These developments in Fiji's trade regime have important implications for Fiji's environment. Given that Fiji has a comparative advantage in agriculture, it follows that it will take advantage of the trade opportunities by expanding agricultural exports. However, as Fiji is an island with a fragile and closed ecosystem, it is particularly vulnerable to unsustainable agricultural practices. Therefore, there is a need for research such as this

one which attempt to estimate the impacts of increased liberalisation on agricultural production, the economy in general, and feedback effects on the environment.

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## 4 Objectives

The overall goal of this project is to empirically assess the economic and environmental impacts of agricultural trade liberalisation on the economy, as well as the environmental effects of increased agricultural production and trade. A secondary goal is to propose supportive policies to enhance sustainable economic development in Fiji. The specific objectives are:

- Assess the impact of trade liberalisation policies on agricultural production, the economy and the environment, with particular emphasis on land degradation.
- Critically review the institutional framework required to make trade, environment and agricultural policies more effective as drivers of sustainable development.
- Collaborate with and build the capacity of the National Planning Office (NPO), the Ministry of Agriculture, and the University of South Pacific (USP).
- Communicate the findings to the stakeholders and the academic community through technical and non-technical publications.

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## 5 Methodology

Given the complex interactions within various sectors of the economy, as well as between the economy and the environment, a computable general equilibrium (CGE) approach was adopted for investigating the impacts of agricultural trade liberalisation. This was supplemented with a series of partial equilibrium (econometric) studies. Given that the environment is a rather broad construct, the investigation of environmental effects in this study was limited to land degradation, in particular soil erosion. An existing CGE model of the Fiji economy (Levantis, 2000) was extensively modified in order to examine the effects of trade liberalisation on the economy and environment. The following modifications were made to the model. First, the model's database was updated from a 1997 base year to a 2002 base year to better reflect the state of the Fijian economy. Second, land, previously aggregated as part of capital, was separated out in order to provide a more accurate picture of land use changes arising from a policy shock. Plans to include subsistence consumption and production of bottled water as new sectors were abandoned due to lack of adequate data. Finally, the model's equations were modified in order to incorporate economy-environment interactions.

At the start of the project, a stakeholder workshop was held to introduce the project and obtain consensus on the key issues relating to agriculture and the environment in Fiji. Two field surveys of Fijian farmers were carried out to further examine the relationships between agricultural productivity and land degradation, as well as the factors affecting farmers' perceptions of land degradation with particular reference to soil conservation. These surveys were preceded by a pilot survey to test the survey questionnaires, which offered an opportunity to fine tune them. The project concluded with a three-day workshop to communicate the survey findings to the stakeholders and provide the Fijian participating institutions practical hands on training on how to run the new CGE model.

## 6 Achievements against activities and outputs/milestones

**Objective 1: To assess the impact of trade liberalization on the economy and the environment, with particular emphasis on effects on land degradation and biodiversity**

no.	activity	outputs/ milestones	completion date	comments
1.1	Update Fiji Input-Output database using 1999 data (PC & A)	Fiji I-O database updated to 2002.	7/04	Late start of activities in PC due to delays in obtaining MOU. Kumar, S. (2005)
1.2	Incorporate subsistence as a sector in database (PC)	Not undertaken	n.a.	It was found that obtaining adequate data on subsistence production required an extensive surveys that were not possible given the time limitations
1.3	Update/modify Fiji CGE model, including model documentation (A)	Model modified and documented.	Model modification completed 11/05. Documented on 1/06	Levantis, T. (2006)
1.4	Develop environmental module (PC & A)	Equations for environmental module developed	7/05	
1.5	Collect data for environmental module (PC & A)	Data collected	8/05	
1.6	Link environmental module to CGE model (A)	Environmental module incorporated	2/06	
1.7	Model testing and evaluation (PC & A)	Testing and evaluation undertaken	2/06	
1.8	Perform policy simulation experiments, analyse and evaluate results (PC & A)	Policy analysis and evaluation undertaken	3/06	Asafu-Adjaye, J. (2007)

PC = partner country, A = Australia



**Objective 2: To critically review the institutional framework required to make trade, environment and agricultural policies more effective as drivers of sustainable development.**

no.	activity	outputs/ milestones	completion date	comments
2.1	Develop set of policy measures to integrate environmental issues into agricultural and trade policies (PC & A)	Policy measures developed.	7/05	Prasad, B.C. and J. Asafu-Adjaye (2005) Asafu-Adjaye (2008)
2.2	Consult with stakeholders' (farmers and policy makers) on formulated policies (PC & A)	Study results and policies presented to Stakeholders	11/07	
2.3	Modify policy measures (PC & A)	Modifications made	12/07	Policy briefs to be completed

PC = partner country, A = Australia

**Objective 3: To collaborate with and build Partner country staff capacity in economics research**

no.	Activity	outputs/ milestones	completion date	comments
3.1	Develop set of policy measures to integrate environmental issues into agricultural and trade policies (PC & A)	Policy measures developed.	7/05	Prasad, B.C. and J. Asafu-Adjaye (2005) Asafu-Adjaye, J. (2007)
3.2	1st Training workshop for NPO and other government analysts (PC & A)	Workshop not conducted due to delay in completing modelling. Formal training of PC collaborators as follows: Mr. Sunil Kumar was admitted to the University of Queensland, PhD program, Feb. 2006 - to present, funded by the University of the South Pacific. Mr. Waisiki Gonemaituba was admitted to the University of Queensland, MPhil program, funded by ACIAR (John Allwright Fellowship).		Both candidates supervised by Renuka Mahadevan and myself will be submitting their thesis by June 2008.
3.3	NPO staff attend work attachment at ABARE, IAAE conference	Not undertaken due to delay in completing modelling.		
3.4	USP staff attend IAAE conference, present seminar at UQ	Not undertaken due to delay in completing modelling.		
3.5	2nd Training workshop for NPO and other government analysts (PC & A)	Training workshop completed.	11/07	

**Objective 4: To communicate the findings to the stakeholders and academic community**

no.	activity	outputs/ milestones	completion date	comments
4.1	Paper on overview of trade and environment in Fiji (PC)	Overview paper completed.	7/05	Prasad, B.C. and J. Asafu-Adjaye (2005)
4.2	Manual on Fiji CGE model (PC & A)	Manual completed.	1/06	Levantis, T. (2006)
4.3	Paper on results of survey to collect environmental data (A)	Papers completed.	2/06 3/07	Asafu-Adjaye, J. (2007) Mahadevan, R. (2007)
4.4	Paper on impacts of trade liberalisation on environment (PC & A)	Papers completed.	3/06	Asafu-Adjaye, J. (2007) Mahadevan, R. and Asafu-Adjaye, J. (2008)
4.5	Non-technical paper on the policy implications of the study targeted at stakeholders (PC & A)	Policy brief to be completed		
4.6	Technical paper on trade and environment in Fiji (PC & A)	Technical paper to be completed		
4.7	Stakeholder (policy) workshop to present results to and discuss findings with stakeholders (PC & A)	Workshop completed	11/07	

## 7 Key results and discussion

The sugarcane yield in Fiji has been declining for some time due to a range of factors including the uncertainty over the renewal of sugarcane leases and declining land quality. A major cause of the decline in land quality is land degradation, in particular, soil erosion. In this project, the first attempt was made to quantify the economic cost of soil degradation to cane farmers and the sugar industry. The cost of soil erosion to farmers was estimated at US\$8 million per annum, while the industry loses US\$12 million in sugar sales per annum. Land degradation could be minimised by discouraging the current practice of burning of cane. Although this practice has some advantages such as facilitating the removal of weeds and destruction of pests, it also contributes to CO<sub>2</sub> emissions and causes rapid loss of soil nutrients, soil erosion, and a deterioration of soil quality. The current cane payment system as set out in the Master Award indirectly provides an economic incentive to burn cane because payment is based on tonnage delivered to the mill rather than on the sugar content. Thus reform of the cane payment system is required not only for environmental reasons, but also to improve the quality of cane produced. Although a payment system based on sugar content has been suggested in the past, there appears to be lack of political will to carry it through.

Despite the high economic cost of land degradation to farmers and the significant external costs it imposes on society in general, soil conservation is very low on the policy

agenda. A number of problems were noted. At the institutional level, there is weakness in implementing and enforcing environmental legislation. At the farm level, there is lack of government support for education and extension services. It is likely that the problem of soil degradation on sugar farms could worsen due to the uncertainty about renewal of farm leases. This is because, faced with uncertain land tenure, Indo-Fijian farmers are unlikely to undertake long-term investments in soil conservation. However, sugar production is not the only area where land degradation is a problem. For example, soil erosion is also high in the cultivation of ginger. Therefore, there is a need to take a comprehensive look at the issue of land degradation and to institute policies to address the problem. We advocate increased government expenditure to improve public education and awareness about land degradation. Farmers in particular need to be educated on affordable technologies in soil conservation. Given the externalities associated with soil conservation, and the cost implications for farmers, there is some justification for the government to enter into cost-sharing soil conservation schemes. Another possible arrangement to consider is assisting farmers to gain access to credit to undertake soil conservation.

The second part of this research was devoted to the analysis of the impacts on the Fijian economy of five different types of trade related policies. The first was the effects of unilateral trade liberalisation by Fiji. This was followed by a comparison of various types of regional and global trading arrangements comprising PICTA by itself, a combination of PICTA, PACER, and the EPAs, partial trade liberalisation involving the removal of tariff barriers only, and full trade liberalisation involving the removal of both tariff and non-tariff barriers. Next, we considered the effects of the loss of EU sugar subsidies, the effects of the EU development aid and the EPAs and various options for structural reform of the Fiji economy.

Unilateral trade liberalisation was found to have some positive benefits in the medium term which dissipate in the long-run. Thus, it was concluded that while there may be some benefits from a country liberalising trade on its own, the positive effects would be limited if other countries maintained their trade barriers. Regional trade agreements (in the form of PICTA, and PICTA and PACER) were then compared to the two forms of global trade liberalisation. PICTA was found to deliver the lowest benefits based on all the macroeconomic indicators, lending some support for the view that south-south trade may not be as beneficial as north-south trade. On the other hand, there were mixed results for PICTA and PACER, partial trade liberalisation and full trade liberalisation. Full trade liberalisation delivered the highest benefits in terms of real output growth. However, it was outperformed by PICTA and PACER and partial trade liberalisation in terms of welfare effects, trade volumes and employment. In general, full trade liberalisation was found to not only enhance traditional exports, but also it promoted the production of non-traded food crops such as root crops rice, and dalo. Therefore, on balance, we conclude that full trade liberalisation would be more beneficial compared to the various regional trade agreements. This conclusion flies in the face of various opinions expressed in the popular press that trade liberalisation would have adverse effects on developing countries because local industries would be wiped out by cheap foreign imports. However, our results do indicate that trade liberalisation could adversely affect the production of non-traded food crops and hence policies are required to mitigate these impacts.

The final set of trade policy simulations was conducted in two parts. The first part considered the loss of the EU sugar subsidies and the impacts of the EPAs, whereas the second part considered options for reforming the sugar sector and boosting growth in

other sectors. In the first part, the following four scenarios were simulated: partial liberalisation of the EU sugar price involving phased price reductions; full liberalisation of the EU sugar price involving a one time cut in the EU sugar subsidy; a standard EPA involving a cut in import tariffs, and an EPA Light scenario involving a smaller cut in import tariffs. These scenarios were then repeated with provision of aid to the sugar sector. It was shown that although the price cuts in the full price liberalisation scenario were more immediate compared to partial price liberalisation, the reductions in real output and exports were smaller for the former due to a higher gain in competitiveness as unproductive farmers are likely to move out leaving the more efficient ones. With aid, the situation was seen to be reversed with the partial price liberalisation providing more gains.

The two types of EPAs were found to have a positive impact on economic growth, with the standard EPA outperforming the EPA Light policy. The tariff cut in the EPAs reduces import prices, resulting in an increase in consumption that makes consumers better off. Also, sectors producing import-competing goods switch from domestic to cheaper foreign sources of inputs and are now able to increase domestic output. Two important findings from this analysis were that firstly, the EPAs are not necessarily contractionary as has been speculated, although imports rise as can be expected and, secondly, the one-off cut appears to smooth adjustment costs more effectively than a gradual price cut. However, when aid to the sugar sector is included as part of the EPA package, the above results are reversed with EPA Light scenario outperforming the standard EPA.

In analysing options for structural reforms, we considered the following five alternatives for reforming the sugar sector and diversifying Fiji's export base. First we considered a base case of a partial EU sugar price liberalisation and reform of the sugar sector with half of the government's cane production targets from 2008 to 2011. On top of this scenario, we superimposed diversification of the agricultural sector, followed by inclusion of productivity growth of the garment sector. The last two separate scenarios considered were expansion of tourism and expansion of fisheries. It was shown that partial price liberalisation combined with sugar sector reforms leads to some improvement in real output although it cannot be sustained. This policy was also found to have an adverse impact on the non-sugar agricultural sector. However, sugar industry reform combined with diversification of the agricultural sector results in rapid real output growth. When these policies were also combined with productivity growth in the tourism sector, we found even more rapid growth. But targeting the tourism sector for growth was found to have adverse impacts on the non-sugar agricultural sector. Finally, increasing fisheries exports had insignificant impacts on the key macroeconomic indicators. The general conclusion arising from this analysis is that broad based diversification of the economy will have more far reaching economic effects in terms of growth and employment than a narrow focus on a particular sector, be it tourism or agriculture. Therefore, what is required to enhance the sustainable economic development of Fiji is broad-based reform targeted to the agricultural, industrial and service sectors.

Fiji, like many other Pacific island countries, is faced with a number of hurdles in competing with larger economies in today's globalised world. First, it has a small domestic market which imposes diseconomies of scale in production and consequent high costs. This results in restricted ability to compete in either domestic or (more especially) export markets for goods. Second, the cost of infrastructural services relative to the population tends to be high. Furthermore, due to both distance and diseconomies of scale, unit costs of transport to and from major markets also tend to be high, adding further to the cost disadvantage. Third, like most small island economies, Fiji's economy

is highly dependent on imports, leading in turn to a high structural trade deficit which has traditionally been offset by protected commodity exports. Fourth, owing to the relatively small population, it has a limited tax base, with a traditionally high level of dependence on import duties. Fifth, there are diseconomies of scale in the public sector, which results in the latter accounting for a relatively large share of GDP, leading to significant structural budget deficits. Sixth, Fiji is prone to climate-related natural disasters, which result in periodic demands for high public expenditure on rebuilding infrastructure and housing and providing disaster relief to affected communities.

In the past these handicaps have been partially offset through the protected market provided by Britain (as a colonial power) for Fiji's single export crop, sugar. At the same time grants from the colonial government helped maintain an adequate level of public administration and infrastructure – i.e., based on standards higher than could have been afforded if the territory had been dependent solely on its own domestic economic resources. However, these privileges, including the more recent EU sugar subsidies, are now things of the past. There is an urgent need for Fiji to seriously consider a total reform of its institutions and development of policies to increase the external competitiveness of its industries.

In the long-run, output and employment in the sugar sector could be significantly improved by value adding generated from initiatives such as sugar refining, electricity generation, and ethanol production. Value adding could also be achieved by encouraging downstream processing of sugar by products. Examples of this include production of animal feed, liquid CO<sub>2</sub>, and fertilizer. It would be impossible to undertake such projects through public investment alone, which is the main reason why the government should create favourable conditions to attract private investment into these areas. In this respect, the areas which need to be urgently addressed are investment policies and the general environment of registering and conducting business. In the latest *Doing Business Report*, the World Bank has ranked Fiji fifth overall in the East Asia and Pacific region in terms of the ease of doing business (World Bank, 2007). Singapore, Hong Kong, Malaysia and Thailand are ranked ahead of Fiji, and Fiji is ranked first in the Pacific island region. Although this is encouraging, in order to successfully compete for foreign direct investment with these countries, Fiji needs to improve in specific areas such as licensing, registration of property, taxation and trade restrictions. As noted earlier, the maintenance of political stability is a key ingredient to attracting both foreign and domestic investment.

The Government of Fiji is committed to a policy of trade liberalisation. This is evident in its acceptance of PICTA and PACER and the signing of an interim EPA with the EU. However, there is an urgent need for policies and actions to place exporters in a better position to take advantage of foreign trade opportunities. At the present time, our assessment is that local exporters are ill equipped to compete in the global market due to a number of constraints that deter an adequate supply response to price signals. These constraints pertain mainly to structural and institutional problems including poorly developed transport and telecommunications infrastructure, inadequate ports and handling facilities, tedious customs procedures, lack of marketing networks, lack of knowledge about standards, lack of microfinance programs, and poor functioning of markets for leasehold land. We suggest that the government could use development aid from the EU to address some of these constraints. In the area of agriculture, there is a need to move from small scale, subsistence agriculture to commercial production of non-sugar crops and to build links with the tourism and manufacturing industries. For example, the tourism sector currently sources most of its food inputs from overseas,

which could be due in part to the poor quality and unreliability of local produce. Commercial production of agricultural produce in line with international standards would not only serve local tourism industries but could also service export markets.

A critical constraint in expanding industrial and agricultural production, especially in terms of absorbing workers made redundant from the loss of the EU sugar subsidies is lack of skills. Thus there is a need for the government to invest in human capital development with specific emphasis on low and middle level skills training. Such a strategy would improve value added in the manufacturing and tourism industries. It could also be a precursor to linking the agricultural and manufacturing sectors through the development and processing of agricultural produce. The development of the technical skills of the large pool of unskilled workers, coupled with a program to assist them to obtain credit, would also enable some of them to establish or expand their farms to feed the agro-based industries.

Agriculture will remain the major provider of national income and employment in Fiji for some time to come. However, given the high variability in the prices of the major agricultural commodities, the way forward for Fiji is to diversify agricultural exports in particular and merchandise exports in general. In this respect, one area where Fiji has a significant resource endowment, given its extensive economic exclusive zone, is fisheries. It was noted that at the present time, the sector is under resourced due to a lack of skills and infrastructure. Much of the revenue from the fisheries sector is derived from the issuance of fishing licenses to foreign fleets. Despite Fiji's remoteness from the major export markets, there is the potential to target niche markets for processed fish products. However, once again, what is required is a policy package which will attract investment (both domestic and foreign) into this sector. Such a package should include tax incentives, financial assistance to local producers, and infrastructure development schemes. Our study results indicate that the best strategy to achieve sustainable economic growth is a broad-based development approach which does not target a specific sector. Targeting one sector for development will have adverse impacts on others. Thus we advocate a strategy which aims to strengthen the linkages between the agricultural, fisheries, tourism, and manufacturing sectors.

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## 8 Impacts

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### 8.1 Scientific impacts – now and in 5 years

This project has contributed to the scientific understanding of the environmental and other factors affecting agricultural productivity in Fiji, as well as understanding of the economywide impacts of trade liberalisation policies. In the last three years, the project's findings have been presented at domestic and international conferences, and they have been generally well received. The following journal articles have been published in highly reputable economic journals, four of which are high impact factor journals found in the Social Sciences Citation Index:

- Mahadevan, R., 'The Twin Challenges of Efficiency and Soil Erosion in Fiji's Sugar Industry', forthcoming, *Ecological Economics*; corrected proof available online on Ecological Economics Website.



- Asafu-Adjaye, J. and Mahadevan, R., Regional Trade Agreements versus Global Trade Liberalisation: Implications for a Small Island Developing State, forthcoming, *The World Economy*, 2008.
- Asafu-Adjaye, J. 'Factors Affecting the Adoption of Soil Conservation Measures: A Case Study of Fijian Cane Farmers', forthcoming, *Journal of Agricultural and Resource Economics*, 2008.
- Mahadevan, R., 'The Viability of Fiji's Sugar Industry', forthcoming, *Journal of Economic Studies*, 2008.
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- Asafu-Adjaye, J., 'Liberalising Trade in the Agriculture Sector of a Small Island State: The Case of Fiji', *The World Economy*, vol. 30, no. 10, pp. 1550-1567, 2007.

### Book

- Mahadevan, R., and Asafu-Adjaye, J., (2008) *Agricultural Development and Trade Liberalisation: Implications for a Small Island State*, Nova Publishers, in press.

The following papers are under various stages of review by journals:

- Mahadevan, R. and Asafu-Adjaye, J., 'The Implications of EU Sugar Price Cuts, Economic Partnership Agreement and Development Aid for Fiji', Revised and resubmitted to *Contemporary Economic Policy*.
- Asafu-Adjaye, J. and Mahadevan, R. Lessons from the Unfinished Agenda of a Small Developing Economy under Trade and Structural Reforms, submitted to *Applied Economics*.
- Mahadevan, R., 'The Withdrawal of EU Sugar Preferences and the Bitter-Sweet Reform Pill for Fiji', submitted to *Pacific Economic Bulletin*.

Given that the impact of trade liberalisation on the economy and the environment has not generally been sufficiently investigated for Pacific Island countries, it is expected that the work produced in this research will have greater scientific impacts within the next five years as the papers are read and cited.

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## 8.2 Capacity impacts – now and in 5 years

The model which was developed in this study is important for the work of staff in the NPO and Ministry of Agriculture (Trade Division). The model has now been handed over to these government agencies after the final project workshop during which the participants were taught the basics of implementing the model and interpreting the results. It is expected that in the coming years, the model will increasingly be used to inform policy debate and analysis in Fiji. In addition, the project has built capacity in terms of formal training in economic analysis.

Two project participants, Mr Sunil Kumar and Mr Waisiki Gonemaituba, will complete their research degrees in 2008 under the supervision of Dr. Renuka Mahadevan and Assoc. Prof. John Asafu-Adjaye. Mr Kumar's PhD thesis (funded by the University of the South Pacific) is on the causes of intra-household inequality and its consequences for poverty determination in Fiji'. Mr Gonemaituba's MPhil thesis (funded by a John Allwright Fellowship) investigates the economic and environmental implications of the ginger

industry in Fiji. It is expected that these researchers will also informally train staff working under them upon completion of their research. So far, the work of these students has resulted in the following research papers:

- Mahadevan, R., and Gonemaituba, W. 'The Observed and Unobserved Loss in Fiji's Ginger Production', submitted to *Journal of Agricultural and Resource Economics*.
- Kumar, S. and Mahadevan, R., 'Is There Poverty Within Non-Poor Households in a Small Developing Economy?', submitted to *World Development*.
- Kumar, S. and Mahadevan, R., 'What Can Be Inferred from Intra-Household Inequality from a Small Pacific Economy?', work in progress.

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### 8.3 Community impacts – now and in 5 years

Fiji is facing important challenges in her agricultural sector with the impending changes in the structure of international trade. The full implications of these changes have not been fully discussed in the policy arena. Our two stakeholder workshops have enhanced the awareness of the participants about the usefulness of economic analysis in these matters. The workshops, including the associated press coverage, have also highlighted the severity of the land degradation problem in Fiji and the urgent need for action to address the problem. We expect the community impacts to increase within the next five years as we continue to publicise our findings in both the academic and popular media (e.g., print, TV).

#### 8.3.1 Economic impacts

The economic impacts of the project will be indirect and long-term in nature and are conditional on the project recommendations being implemented. It has been demonstrated in the study that erosion damage arising from increased agricultural production can lead to on-site productivity losses. The cost of soil erosion on sugar farms was estimated at about US\$8 million per annum, while the industry losses are about US\$12 million in sugar sales per annum. The off-site costs of soil erosion are also considerable. Therefore, action to reduce soil erosion will yield significant economic benefits to the country. The results of our simulation experiments could assist the government to develop appropriate policies to address economic inefficiency and equity issues associated with agricultural production. Implementation of such policies will, in turn, generate cost-savings to the economy in the long-run.

Indirect economic benefits will also accrue through the capacity building component of the project. Fiji currently has a shortage of planners and analysts with adequate skills to conduct economic modelling and forecasting. The skills of the Fijian participants have been enhanced through the training workshops, training visits and the formal and informal interactions with the Australian researchers. Through the skills acquired in the project, it is expected that Fijian participants will be able to assist the government to develop more proactive policies which will be beneficial to the country.

#### 8.3.2 Social impacts

Through the project, policies have been proposed to address environmental issues (in particular, soil conservation) in agricultural production. These policies will have no adverse cultural, religious or ethnic impacts. On the other hand, action taken to implement the recommendations will improve agricultural productivity which will have not



only economic, but also social benefits. Given that women in Fiji play an active role in the production, processing and marketing of agricultural produce, addressing the issue of soil erosion will have a positive long-run impact on economic returns to women and thus improve their social welfare.

### 8.3.3 Environmental impacts

Implementation of the policies proposed in the study will have a long term positive impact on the environment. In the past, government policies such as price supports, input subsidies, lack of well-defined property rights and provision of subsidised credit have indirectly had adverse impacts on the environment. For example, input subsidization, while increasing food production levels, has also resulted in more intensive input use, increased rate of land conversion, and increased soil erosion. The project recommendation in respect of soil conservation could lead to a sustainable agricultural production.

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## 8.4 Communication and dissemination activities

The project team is currently engaged in the dissemination of the project's findings to the stakeholders and the wider community. As indicated in Section 8.1, the communication and dissemination activities in the past three years have focussed mainly on writing up the results for the scientific community. Project findings were also disseminated through the workshops. The project's working papers and refereed journal articles will be made available on the Australian Project Leader's website. The next phase of the communication and dissemination strategy will focus on writing policy briefs for policy makers, as well as non-technical articles for a general readership. These articles will target the local print media such as the *Fiji Times*.

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# 9 Conclusions and recommendations

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## 9.1 Conclusions

The main objective of this project was to analyse the impacts of trade liberalisation on Fiji's economy and environment and to propose policies to enhance the sustainable development of the country. A secondary objective was to collaborate with and build partner country staff capacity in economics research, with particular reference to economic analysis and environment-economy modelling. We believe this project has been broadly successful in achieving these basic aims.

The key conclusions are as follows:

### **Land Degradation**

Land degradation imposes a high economic cost on farmers and the society at large and yet the issue of soil conservation is low on the policy agenda. At the institutional level, the project identified a weakness in implementing and enforcing environmental legislation. At the farm level, we found lack of government support for farmer education and extension services. Government policies such as the cane payment system have indirectly encouraged the practice of cane burning, which have reduced environmental quality.

### **Trade Liberalisation**

Our extensive analyses on the implications of trade liberalisation indicate varying degrees of potential benefits to the economy depending on the extent of liberalisation and the reciprocity of trade reforms by Fiji's trading partners. While various regional trade agreements will yield some overall benefits, the best outcome for Fiji is global trade liberalisation involving removal of tariff and non-tariff barriers between the developed and developing countries. To successfully meet the impending challenges brought on by trade liberalisation, Fiji would need to restructure its agriculture sector (in particular the sugar sector) and expand its export base. We found that targeting a particular sector for growth is likely to have adverse impacts on other sectors. Therefore, broad diversification of the economy would deliver the best outcomes for the economy. For this to be possible there is a need to address the institutional and structural constraints that inhibit producers' ability to react to favourable market conditions.

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## **9.2 Recommendations**

The key policy recommendations arising from the study are as follows:

There is a need for the government to take a comprehensive look at the issue of land degradation and to institute policies to address the problem.

We advocate increased government expenditure to improve public education and awareness about land degradation.

There appears to be lack of awareness in the general community about the effects of trade liberalisation. Information put out in the local media by anti-trade NGOs show trade liberalisation to have adverse effects on the economy. However, our research indicates that the net benefits can be positive. There is therefore a need for more public education on this issue.

There is a need for the government to harness both internal and external resources to address structural and institutional constraints such as poorly developed transport and telecommunications infrastructure, inadequate ports and handling facilities, tedious customs procedures, lack of marketing networks, lack of knowledge about standards, lack of microfinance programs, and poor functioning of markets for leasehold land.

There is a need for the government to invest in human capital development with specific emphasis on low and middle level skills training.

Based on feedback received from workshop participants and on our own observations in the course of conducting this research, the ability of government agencies to conduct policy analysis is vital to effective decision making. However, this is one area where capacity is grossly lacking even in a country like Fiji where educational levels are relatively high compared to other Pacific Island Countries. Therefore, there is a need for more initiatives such as this one to build capacity within government agencies.

The modelling approach used in this study could be extended in the future to further investigate the links between the economy, the environment and poverty, which could further enhance our understanding of these complex relationships and help to propose more effective poverty alleviation programs.

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## 10 References

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Swami, S. 2004, 'Watershed management in Fiji', paper presented at a workshop on Trade Liberalisation, Agriculture and Land Degradation in Fiji: Implications for Sustainable Development Policies, Suva, 15-16 April.

World Bank (2007) *Doing Business 2007*, accessed on 25 October 2007 at <http://www.doingbusiness.org/economyrankings/?regionid=1>

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### 10.2 List of publications produced by project

Mahadevan, R., 'The Twin Challenges of Efficiency and Soil Erosion in Fiji's Sugar Industry', forthcoming, *Ecological Economics*; corrected proof available online on Ecological Economics Website.

Asafu-Adjaye, J. and Mahadevan, R., Regional Trade Agreements versus Global Trade Liberalisation: Implications for a Small Island Developing State, forthcoming, *The World Economy*, 2008.

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Mahadevan, R., 'The Withdrawal of EU Sugar Preferences and the Bitter-Sweet Reform Pill for Fiji', submitted to *Pacific Economic Bulletin*.

### **Project Working Papers**

Asafu-Adjaye, J. (2006) 'Factors Affecting Soil Conservation in Fiji Agriculture: A Case Study of Sugarcane Farmers', ACIAR Working Paper 2006-2, School of Economics, The University of Queensland.

Asafu-Adjaye, J. and Mahadevan, R. (2007) 'Regional Trade Agreements versus Global Trade Liberalisation: Implications for a Small Island Developing State' ACIAR Working Paper 2007-1, School of Economics, The University of Queensland.

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## 11 Appendixes

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### 11.1 2004 Workshop



**Australian Government**  
**Australian Centre for  
International Agricultural Research**

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Workshop on the ACIAR Project 'Trade Liberalisation, Agriculture and Land Degradation in Fiji: Implications for Sustainable Development Policies'

***Raffles Tradewinds Hotel, Suva, 15-16 April 2004***

*Collaborating Institutions*

The workshop is funded through funds approved by ACIAR for the project on Trade Liberalisation, Agriculture and the Environment, Fiji (ADP/2002/047). Presentations will be made by representatives from The University of Queensland (UQ), the University of the South Pacific (USP), Ministry of Agriculture, Sugar and Land Resettlement (MASLR), Ministry of Finance and National Planning and the Ministry of Local Government, Housing and the Environment. Attending the workshop will be representatives from various organisations including the Fijian Affairs Board, Ginger Council, South Pacific Commission, GTZ, Sugar Cane Growers Association, Fiji Sugar Corporation, landowner representatives and tenant representatives.

*Workshop Aim*

The aim of the workshop is to increase the understanding of the participants about the project objectives, methodology and the range of policy issues that to be analysed.

*Workshop Objectives*

- Explain the interrelationships between trade, agriculture and the environment
- Explain the effects of land use on soil degradation, especially soil erosion
- Explain ways in which the economic cost of land degradation could be measured
- Explain issues affecting the productivity of crop production
- Explain ways in which the effects of trade liberalisation on land degradation could be measured
- Discuss possible institutional responses to the problem of land degradation, in general, and soil erosion, in particular

*Workshop Outcomes*

- Increase the understanding of participants on the interrelationships between trade and the environment
- Increase the understanding of the participants on the effects of land use on soil degradation, especially soil erosion

### *Workshop Recommendations*

The project team will use policy recommendations emanating from the workshop to augment the existing work plan.

### **Workshop Programme**

#### *Day 1 – Thursday, 15 April 2004*

<b>TIME</b>	<b>SESSION</b>	<b>TOPICS</b>
10am	Welcome statement	Project Leader – Dr. John Asafu-Adjaye, UQ
10.15am	Opening speech	CEO, MASLR
10.30am	Opening statement	Chief Economist, MASLR – Mr Paula Taukei
10.40am	Opening statement	Professor Ron Duncan, USP
10.50am	Outline of the workshop	Dr. John Asafu-Adjaye
11.00-11.30am	Coffee break	
11.30-12.30pm	Presentation #1	Overview of trade liberalisation and the environment in PICs – Assoc. Prof. Biman Prasad, USP
12.30-1.00pm		Round table discussion on trade and environment
1.00-2.00pm	Lunch	
2.00-3.00pm	Presentation #2	Overview of land use and land degradation problems in Fiji – Mr. Inoke Ratukalou, Director, LRPD, MASLR
3.00-4.00pm	Presentation #3	Measures to address land degradation: current and planned projects - Mr. Satya Swami, Director, Land & Water Resource Management, MASLR
4.00-4.30	Coffee break	
4.30-5.00pm		Round table discussion
5.00pm	End of Day 1 sessions	

#### *Day 2 – Friday, 16 April 2004*

<b>TIME</b>	<b>SESSION</b>	<b>TOPICS</b>
9-10.00am	Presentation #4	Modelling the interrelationships between trade liberalisation, agriculture and the environment – Dr. John Asafu-Adjaye, UQ
10.00-10.30am		Round table discussion
10.30-11.00am	<b>Coffee break</b>	
11.00-11.30am	Presentation #5	Issues affecting the productivity of crop production – Dr. Renuka Mahadevan, UQ
11.30-12.00pm		Round table discussion
12.00-12.30pm	<b>Workshop recommendations</b>	Participants
12.30-2.00pm	<b>Lunch</b>	

### ***Institutions attending Workshop***

<b>Institution</b>	<b>Number attending</b>
Sugar Cane Growers Association	2
National Farmers Union	2
Native Land Trust Board	2
Fiji Sugar Corporation	2
NGOs	3
Government Ministries	10
USP	3
Ginger Growers Association – 3	3
Total	27

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## **11.2 2007 Workshop on the ACIAR Funded Project ‘Trade Liberalisation, Agriculture and Land Degradation in Fiji: Implications for Sustainable Development Policies’**

***The University of the South Pacific, Suva, 21-23 November 2007***

### ***Collaborating Institutions***

The workshop is funded through funds approved by ACIAR for the project on Trade Liberalisation, Agriculture and the Environment, Fiji (ADP/2002/047). Presentations will be made by representatives from The University of Queensland (UQ), the University of the South Pacific (USP), the Ministry of Agriculture, and the Ministry of Finance and National Planning. Attending the workshop will be representatives from various ministries and government agencies, development agencies and organisations including the Fijian Affairs Board, Ginger Council, South Pacific Commission, GTZ, Sugar Cane Growers Association, Fiji Sugar Corporation, and NGOs.

### ***Workshop Aim***

The aim of the workshop is to present the results of the research project and to receive feedback, which will be incorporated into policy briefs to be formulated after the workshop. The second part of the workshop will be in the form of technical training to give interested participants hands on experience in using the economic model developed as part of the project.

### ***Workshop Objectives***

- Discuss the impacts of trade liberalization on the Fijian economy and discuss the policy implications
- Discuss the effects of certain types of land use on soil degradation, especially soil erosion
- Discuss the issues efficiency and soil erosion in Fiji's sugar industry
- Discuss possible institutional responses to the problem of land degradation, in general, and soil erosion, in particular

### ***Workshop Outcomes***

- Increase the understanding of participants on the interrelationships between trade policies and the economy



- Increase the understanding of the participants on the effects of land use on soil degradation, especially soil erosion
- Increase participants' understanding about the workings of an economic model

### **Program**

*Day 1: Wednesday, Nov 21*

*Morning Session:*

1. Introduction and Welcome: Assoc. Prof. John Asafu-Adjaye, Univ. of Queensland, 10am
2. Opening Speeches 10.15am
  - Vice Chancellor, USP
  - Professor Ron Duncan
  - Secretary for NPO
  - Secretary for Min of Agric
3. Paper 1: Current State of Negotiations Regarding Sugar Subsidies and EPA – Prof. Biman Prasad, USP, 11.00 – 11.30am
4. Coffee/Tea break 11.30-12.00 pm
5. Paper 2: The Implications of EU Sugar Price Cuts, Economic Partnership Agreement and Development Aid for Fiji – Dr. Renuka Mahadevan, Univ. of Queensland, 12.00-12.45pm
6. Lunch Break: 12.45-1.45pm

*Afternoon Session:*

7. Paper 3: The High Price of Sweetness: The Twin Challenges of Efficiency and Soil Erosion in Fiji's Sugar Industry - Dr. Renuka Mahadevan, Univ. of Queensland, 1.45-2.30 pm
8. Paper 4: The Economic and Environmental Impact of Ginger Cultivation in Fiji - Mr. Waisiki Gonemaituba, Ministry of Agriculture, 2.30-3.30pm
9. Coffee/Tea break 3.30-4.00pm
10. Session closes

*Day 2: Thursday, Nov 22*

*Morning Session:*

1. Paper 1: Regional Trade Agreements versus Global Trade Liberalisation:
  - Implications for a Small Island Developing State – Assoc. Prof. John Asafu-Adjaye, Univ. of Queensland, 10-11am
2. Coffee/Tea break 11.00-11.30 am
3. Paper 2: Factors Affecting Soil Conservation in Fiji Agriculture: A Case Study of Sugarcane Farmers – Assoc. Prof. John Asafu-Adjaye, Univ. of Queensland, 11.30 - 12.30pm
4. Lunch Break: 12.30 -1.30 pm



*Afternoon Session:*

5. GEMPACK training: 1.30 – 4.30pm

*Day 3: Friday, Nov 23*

*Morning Session:*

1. GEMPACK training: 10.00 – 10-11am
2. Coffee/Tea break 11.00-11.30 am
3. GEMPACK training: 11.30 – 12.30pm
4. Lunch Break: 12.30 -1.30 pm

*Afternoon Session:*

5. GEMPACK training: 1.30 – 4.00pm