

29TH ASIA AND PACIFIC PLANT PROTECTION COMMISSION

07-11 September 2015, Bali Indonesia

Republic of Fiji

Summary Report

The Agriculture sector (non-sugar) in Fiji is driven by majority of subsistence & semi-subsistence farmers. The Fiji 2020 Agriculture Sector Policy Agenda was launched by the Prime Minister of the Republic of Fiji in August 2014. The policy's main purpose is to establish a diversified and economically and environmentally sustainable agriculture economy in Fiji. One of the policy objectives is to build modern agriculture in Fiji as an organized system of production which involves farmer field schools that promotes integrated production and pest management.

The Ministry of Agriculture's (MoA) Plant Protection Section is mandated to provide technical support on plant pest diagnostics and advisory services on management of pests (insects, diseases and weeds) and pesticide regulatory in Fiji. The Fiji Pesticide Act, No. 41 of 1971 is currently being revised with the support from the Attorney General's Office. A total of 338 pesticide trade names have been registered for use in agriculture and households. The Plant Protection Section is headed by the Principal Research Officer and reports to the Director Research.

Important pest of concern include: taro beetle (*Papuana uninodis*), coconut rhinoceros beetle (*Oryctes rhinoceros*), coconut stick insects (*Graeffea crouanii*), Fruit flies (*Bactrocera passiflorae* and *B. xanthodes*), chilli anthracnose (*Colletotrichum* spp.), wedelia (*Sphagneticola trilobata*) and African tulip tree (*Spathodea campanulata*). These pests continue to be a problem despite attempts by the MoA and other stakeholders to control them. The MoA in collaboration with Biosecurity Authority of Fiji and some support from The Secretariat of the Pacific Community (SPC), carries out monitoring and surveillance of economic pests such as Fruit fly and surveys of pests and updating of the Pest List Database for Fiji.

The Biosecurity Authority of Fiji (BAF) was established under the Biosecurity Promulgation in December 2008 and become a full-fledged authority in January 2011. It is a Commercial Statutory Authority under the Public Enterprise Act 1996. BAF is mandated to protect Fiji's agricultural sector from the introduction and spread of pests of plants and animals and facilitate access to viable agro-export markets and ensure compliance of Fiji's agro-exports to overseas market requirements.

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Republic of Fiji

Country Report

1. General Information

- Fiji has c. 332 islands with 110 inhabited. Has a land area of 18,274 sq km with c. 23% agricultural & 56% forest land. Has a population of 909,389 (July 2015 est.).
- The Ministry of Agriculture's Plant Protection Section is one of the four main units in the Crop Research Division of the Ministry. The Plant Protection Section is based at the Koronivia Research Station near Nausori town. The Plant Protection Section is mandated to provide technical and advisory support services on plant pests (insects, diseases and weeds) (see Appendix 6.2) management and pesticide regulatory role in Fiji.
- A new Plant Protection Section organization structure was endorsed by the Ministry of Agriculture Staff Board in April 2015. This new structure includes merging of two senior positions & creation of five new positions providing a total of 17 positions in the area of Plant Pathology, Entomology, Tropical Weed Research and Fruit fly Unit and consequently providing a clear career path for staff. The Plant Protection Section is headed by a Principal Research Officer.
- The Biosecurity Authority of Fiji (BAF) was established under the Biosecurity Promulgation in December 2008. It is a Commercial Statutory Authority under the Public Enterprise Act 1996. It is mandated to protect Fiji's agricultural sector from the introduction and spread of pests and diseases of plants and animals and facilitate access to viable agro-export markets and ensure compliance of Fiji's agro-exports to overseas market requirements.
- A new Head of BAF, Executive Chairman Mr Xavier Riyaz Khan was appointed in 2013 and BAF's headquarters has been relocated to Level 3, Provident Plaza I, Ellery Street, Suva, Fiji.
- A 10 per cent pay rise for all seventy Biosecurity Authority of Fiji (BAF) frontline officers in January 2014 in recognition of their hard work and service.

2. Phytosanitary measures (Plant quarantine)

- a) The appointment of the Head of Biosecurity Authority of Fiji (BAF), Executive Chairman Mr Xavier Riyaz Khan in 2013.

New Office Headquarters:

Biosecurity Authority of Fiji (BAF)
Level 3, Provident Plaza I, Ellery Street, Suva, Fiji
Phone: (679) 3312512
Fax: (679) 3305043 | Website: <http://www.baf.com.fj>

- b) The Australian Department of Agriculture, Fisheries and Forestry (DAFF) has issued the import condition in 2014 for fresh ginger from Fiji, officially giving the green light to the Australian ginger importers begin trade with Fiji.

The import condition on fresh ginger from Fiji can be accessed on DAFF ICON database <http://www.daff.gov.au/biosecurity/import/icon-icd>.

- c) The Biosecurity Authority of Fiji (BAF) launched its redesigned website www.baf.com.fj with new look and additional features designed to improve usability. Intuitive access information navigational tools, new fonts, and updated graphics and layouts will help visitors access information more quickly and easily on the new website.
- d) BAF embarked on developing a 3-year strategic training plan in 2014 that will not only enhance the capacity of its staff but will also strengthen border protection. The purpose of the meeting was to discuss the scope of BAF's biosecurity management responsibilities, to describe the range of activities and to agree on training needs and priorities for short, medium and long term. Dr Souad Boudjelas- the Program Manager for the Pacific Invasive Initiatives (PII) at the University of Auckland was the leading facilitator at the BAF Training needs meeting.
- e) In 2014, BAF has enhanced security features of its Import and Export permits to align with international practices, prevent fraud and boost its branding. BAF began issuing the new permits by the end of November 2014.

The features of the new import and export permits issued by BAF include:

- Fijian Coat of Arms on the top right hand corner;
 - Water mark of BAF logo in the middle;
 - Fijian flag on the bottom left hand corner;
 - Embossed stamp on the bottom right hand corner; and
 - 120gsm paper (thicker paper).
- f) In 2013, BAF together with the Fiji Customs and Revenue Authority further strengthened Fiji's border security with the purchase of 4 new x-ray machines for the Nadi International Airport. The old x-ray machine from Nadi was then transferred to Nausori Airport and for the first time, the Nausori Airport also has x-ray machine which is helping BAF in detecting prohibited items and timely clearance of passengers at the airport.
- g) Important economic insect pest, plant diseases and weeds that are not present in Fiji and we don't want to have them in the country are:

Common name	Scientific name
Taro leaf blight	<i>Phytophthora colocasiae</i>
Papaya ringspot disease	<i>Papaya ringspot virus</i>
Bacterial crown rot	<i>Erwinia papayae</i>
Lethal yellowing of coconut	Bogia Coconut Syndrome
Giant African snail	<i>Achatina fulica</i>
Asian gypsy moth	<i>Lymantria dispar asiatica</i> , <i>Lymantria dispar japonica</i> , <i>Lymantria albescens</i> , <i>Lymantria umbrosa</i> , and <i>Lymantria postalba</i>
Asian longhorn beetle	<i>Anoplophora glabripennis</i>
Parthenium weed	<i>Parthenium hysterophorus</i>

3. Surveillance, Pest Outbreaks and Invasive Species Management

- **Changes in national strategy, organization, legislation and regulations since 2013**

There is no vast change in the national strategy, organization, legislation and regulations since 2013. However, since the Biosecurity Authority of Fiji (BAF) became a full-fledged authority in January 2011, it has progressed to become one of the leading quarantine agency in the Pacific Island region. BAF is a Commercial Statutory Authority under the Public Enterprise Act 1996.

- **Pest surveillance activities**

- a) The Ministry of Agriculture's Research Division and the Biosecurity Authority of Fiji (BAF) maintained the national quarantine surveillance system for fruit flies, which were mainly focused on Viti Levu. Installation, servicing and maintenance of traps were also carried out on Rotuma, the Southern Lau Group, the Mamanuca Group and Taveuni. New traps were placed at Koro Island and Kadavu in 2014. The major constraint was the irregular trap clearances. The fruit fly surveillance database is maintained at the Ministry of Agriculture's Koronivia Research Station.
- b) BAF joins forces with the Fiji Police Force to address Biosecurity Risks. Forty one (41) police officers have been appointed as Temporary Biosecurity Officers (TBSOs) to assist the BAF with its operations around the country. Police Officers have been called upon primarily to assist BAF with border surveillance at Fiji's wharfs and airports, as well as to provide shop surveillance. The officers were appointed under the terms of a Memorandum of Understanding (MOU) signed between BAF and the Fiji Police Force in 2009 for cooperation between the two organisations to tackle specific biosecurity threats.
- c) BAF signed a MOU with the Department of Immigration in 2014 for sharing of information and cooperation between both agencies and

enable them to better collaborate in enhancing border security and safety in Fiji.

- d) BAF together with the Fiji Revenue and Customs Authority signed a MOU in 2014 for sharing of information and cooperation between both agencies. The MOU allows them to better collaborate in enhancing border security and safety in Fiji.

- **Outbreaks and control of specific pest including invasive species and migratory pest**

- a) Taro beetle (*Papuana uninodis*) outbreak in Lawaki village Kadavu Island, Fiji. After a thorough survey it was confirmed that a high infestation of taro beetle was present in taro (*Colocasia esculenta*) farms at Lawaki village. A farmer field school has been conducted at Lawaki village and taro beetle management awareness on the island of Kadavu. Movement of planting materials from infested to non-infested areas is prohibited. Taro beetle leaflet being prepared & distributed to farmers & general public & also provided online via:

- <http://www.agriculture.gov.fj/images/docs/publications/farmers-leaflets/prevention-and-control-of-dalo-beetle.pdf>
- <http://www.baf.com.fj/images/Publication/Brochures/5%20BAF%E2%80%A2Taro%20Beetle%20Brochure.pdf>

- b) The Plant Protection team attend to complaints in areas with high infestation of coconut rhinoceros beetle and setting up ground traps with the use of *Metarhizium* fungus and *nudivirus* and the installation of pheromone bucket traps.
- c) Outbreak of the Coconut stick insect (*Graeffea crouanii*) was observed in Taveuni, Vanua Levu and Viti Levu Fiji where severe damage on some coconut leaves occurred. The biological control agents, native wasps *Paranastatus nigriscutellatus* and *P. verticalis*, which parasitizes the eggs of *G. crouanii* is reared at Koronivia Research Station and released to infected areas (Deesh et al., 2013).
- d) The chilli anthracnose disease was first reported in 2010, and the species was identified as *Colletotrichum acutatum*. In 2012, an additional species was identified as *C. gloeosporioides*. In early 2015, another new species *C. scovillei* was identified. Kocide fungicide is recommended for controlling chilli anthracnose.
- e) A survey on three export commodities, Eggplant (*Solanum melongena*), Okra (*Abelmoschus esculentus*) and Amaranthus (*Amaranthus* spp.) conducted every quarter to determine pest load in the field.
- f) BAF has placed an internal biosecurity ban on shipment of all fruits to and from Rotuma Island. Declaration for infested biosecurity control areas for fruit fly *Bactrocera xanthodes* & *B. kirki*. Failure to comply with this declaration is an offence under Biosecurity Promulgation 2008.
<http://www.baf.com.fj/images/Publication/Brochures/2%20Fruit%20Fly%20Rotuma%20Brochure%20Eng%29.pdf>.

- g) The American Iguana is a declared pest in Fiji. It is thought to have been brought illegally into the country and released on Qamea Island. American iguanas pose an immediate threat to food security in villages and islands where they are present as they eat plants such as dalo and cassava leaves, bele, tomatoes and cabbage, beans and yam vines. Biosecurity Authority of Fiji (BAF) has declared the islands of Qamea, Matagi, Taveuni and Laucala as Biosecurity Emergency Area. Movement of all stages of American Iguana including its egg into, out of, or within the declared Biosecurity Emergency Areas is strictly prohibited. Failure to comply with this declaration is an offence under Biosecurity Promulgation 2008. Methods of management includes:
1. Awareness and training- Training village heads and district representatives on American Iguana.
 2. Capture and kill- Villagers have been trained by experts on how to capture and kill American Iguanas in a humane manner.
 3. Launched the Biosecurity short code 5995 specifically for American iguana to allow all people enquiring or providing information on the pest to easily contact BAF.
- h) African tulip tree (*Spathodea campanulata*): awareness & demonstration on control of the invasive species which includes distribution of leaflet and is available online at <http://www.agriculture.gov.fj/images/docs/publications/farmers-leaflets/control-of-african-tulip.pdf>

○ **Lessons and experiences as well as in difficulties in controlling pest outbreaks and the newly invaded species**

- a) Farmers hesitant to take up the new innovation in terms of control methods of a particular pest as they have their own methods of controlling pests.
- b) Some farmers still lack basic knowledge on management of pest. The Ministry of Agriculture's Research Division is training Extension staff on pest identification and management.
- c) There was an occurrence of resistance to insecticide on some insect pest of Head cabbage (*Brassica oleracea*).

4. Pest Management

○ **Update of national policies, rules and regulations for promotion of sustainable and environmentally friendly pest management in support of sustainable crop production intensification, which might be relating to food safety, food security and biodiversity approaches**

- a) The Fiji 2020 Agriculture Sector Policy Agenda was prepared by the Ministry of Agriculture with the technical assistance from the FAO was launched by

- the Prime Minister of the Republic of Fiji in August 2014. One of the strategic actions in the policy is the community participation through the Farmers Field School concept in the Integrated Production and Pest Management (IPPM). The document is available at www.agriculture.gov.fj.
- b) The Ministry of Agriculture revised the Farm Management Manual and was launched by the Minister for Agriculture in December 2014. The document contains updated agronomical information about crops cultivated in Fiji, associated pests and their management and other relevant information for farmers, students and stakeholders. The document is available at www.agriculture.gov.fj.

Some activities which help in the identification & management of pest includes:

- Plant Protection Section has been donated with a tablet from the ACIAR-funded ICM Project which has the app 'Pacific Pest and Pathogen' of > 200 insect pest and disease fact sheets. The app which can be downloaded to a smart phone is very helpful in pest identification and facilitates pest management advise for our farmers.
 - Training of Extension Officers on Plant Health Clinic concept. First training of 24 Extension Officers conducted from 29-31 July 2015.
- **Progress and impact of on-going IPM (including biological control) programmes, ecological approaches and farmer field schools**
- a) *Farmer Field School*: This FAO sponsored Technical Cooperation Project (TCP), fully supports the reduction of hazardous pesticide use in Pacific agriculture. As part of the Project, Extension and Research officers from the Western and Central divisions of the Ministry of Agriculture were trained by a consultant on how to carry out and run Farmer Field Schools (FFS). These field schools were trialled first as Trainer Field Schools for the building of participant's confidence. These officers then carried out Farmer Field Schools with designated *Brassica* farmers in their localities. These TFS's were monitored weekly by the participants from seedling stage up until harvesting. Participants practiced the Insecticide Resistance Management strategy with their farmers whereby a variety of IPM compatible insecticides were rotated during the crop cycle.
- b) *Launching of Bt - biological insecticide*: The Ministry of Agriculture, Secretariat of the Pacific Community (SPC) in conjunction with the FAO project "Capacity building to promote adoption of technologies to reduce hazardous pesticide use in Pacific agriculture" and the Australian Centre for International Agricultural Research (ACIAR) project "Strengthening Integrated Crop Management research in the Pacific Islands in support of

sustainable intensification of high value crop production” launched a biological insecticide Bacillus “Bt”.The launch included stakeholders such as Farmers and pesticide dealers to Ministry staff. The launching of this IPM compatible pesticide took place in the Western, Central and Northern divisions. The reintroduction of this biological insecticide was a result of the increasing resistance of Diamonback moth (*Plutella xylostella*) to the current recommended pesticides.

- c) *Coconut rhinoceros beetle*: The Plant Protection team attend to complaints in areas with high infestation of coconut rhinoceros beetle and setting up ground traps with the use of *Metarhizium* fungus and *nudivirus* and the installation of pheromone bucket traps to help control the pest. The presence of *nudivirus* on some adults distance from the release sites demonstrates spread of the bioagent.
- d) *Coconut stick insect*: Higher incidence of coconut stick insect (*Graeffea crouanii*) damage are commonly observed in the leeward than windward sides of Taveuni, Vanua Levu and Viti Levu Fiji. The biological control agents, *Paranastatus nigriscutellatus* and *P. verticalis*, native wasps which parasitizes the eggs of *G. crouanii* are reared at Koronivia Research Station and released to infected areas. The biocontrol agent parasitized up to 65% of exposed fresh eggs of coconut stick insect in the laboratory.

- o **Status of major pest outbreaks and progress of the managements**

- a) Chilli anthracnose disease is widespread affecting both Chilli and Capsicum, particularly on Viti Levu and parts of Vanua Levu. Three *Colletotrichum* spp. have so far been identified causing anthracnose disease on Chilli. Crop loss on some farms is substantial. A number of locally available fungicides have been tested and Kocide is the most effective. With the assistance from AVRDC, Chill anthracnose disease resistant cultivars were imported and currently being trialed at Sigatoka Research Station.
- b) Asian Subterranean termite infestation: All communities from Drasa to Saru including Lautoka City have been declared as biosecurity emergency areas under the Biosecurity Emergency Regulation 2010. The Biosecurity Emergency (Termites) Regulation 2010 is currently in effect and prohibits removal of any wooden materials, plants and plant products, timber and building material, furniture; personal effects and soil from infested areas. Offences carry a maximum penalty of \$40,000 fine for individuals and \$200,000 fines for corporate bodies.

5. Pesticide Management

- **Changes/improvements in national strategy, organization, legislation, regulations and registrations since 2013**

Fiji Pesticide Act No. 41 of 1971 is currently under review by the Solicitor General's Office.

- **National targets, efforts and progress with regard to pesticide risk reduction as well as phasing out highly hazardous pesticides**

- The organic agriculture as highlighted in the Fiji 2020 Agriculture Sector Policy Agenda states that 'In outer islands and in remote areas not exposed to commercial agriculture, organic agriculture must be promoted'. So far two islands have been declared organic islands, they are Cicia and Wakaya Islands. In addition, seven companies in Fiji have been certified and are currently producing organic products. Furthermore, the Fiji Sugar Cooperation has removed paraquat from its list of herbicides for controlling weeds in sugarcane farms in Fiji.
- Workshop on Human Health and Environmental Risk Assessment for Pesticide Registration in Pacific Islands attended by Research staff of the Ministry of Agriculture and other regional counterparts at the Secretariat of the Pacific Community, Fiji from 26th April to 1st May, 2015.
- Pesticide survey is carried out by the Ministry of Agriculture's Plant Protection team at pesticide-retail outlets around Fiji. Each pesticide outlet is inspected at least once a year.

- **Development and application status of bio-pesticides, including botanical pesticides**

A preliminary bio-pesticides trial has been established at Koronivia Research Station farm in June 2015. This trial involves testing of a number of local plant species to determine their effectiveness against common insect pests of vegetables.

- **Update list of banned/prohibited pesticides**

No pesticide has been banned in Fiji to date but process of omitting pesticides that are no longer imported and sold locally from the Pesticide Registration list is in progress. Process of ceasing new registration of Paraquat herbicide is also in progress.

- **Regulatory control scheme in place for pesticide advertisements and incidents, if any, of deviation from the national laws or related provisions of the International Code of Conduct on pesticides management**

The current Pesticide Bill is with Solicitor General's Office for final vetting. This Bill once approved will include fees and fines for pesticide registration thus a regulatory control scheme will be in place through charging local companies for breaches.

- **Status of management of obsolete pesticides**

Obsolete pesticides are being returned to supplier locally or internationally and disposed off appropriately by the supplier.

6.0 Appendix

6.1 Relevant Publications

Deesh, A, Caucau, A and Macanawai, A.R. (2013). Atherigona. Fact Sheet I/1, Ministry of Agriculture, Suva, Fiji. www.agriculture.gov.fj.

Deesh, A. D., Swamy, B.N. and Khan, M.G.M. (2013). Distribution of coconut stick insect, *Graeffea croanii* and its parasitoids in selected islands of Fiji. Fiji Agricultural Journal 53(1), 18-24. www.agriculture.gov.fj.

Fong-Lomavatu, M. Nawaduadua, v. and Macanawai, A.R. (2013). Chilli anthracnose disease. Fact Sheet D3, Ministry of Agriculture, Suva, Fiji. www.agriculture.gov.fj.

Biosecurity Authority of Fiji (2010). Operation Kadivuka (eradication of Asian Subterranean termite infestation in Fiji. http://www.baf.com.fj/images/Publication/Brochures/1%20BAF%20operation_kadivuka_brochure%5B1%5D.pdf

Biosecurity Authority of Fiji (n.d.). Rotuma Fruitfly Information Sheet. <http://www.baf.com.fj/images/Publication/Brochures/2%20Fruit%20Fly%20Rotuma%20Brochure%20Eng%29.pdf>.

Biosecurity Authority of Fiji (n.d.). American iguana. <http://www.baf.com.fj/images/Publication/Brochures/4%20American%20Iguana%20Brochure%20Print.pdf>.

6.2 Common Pest & Diseases of crops in Fiji

The most common insect pests & diseases of crops are as follows:

A) Insect pests

Crop	Common Insect pest name	Scientific name
Rice	Rice leaf roller/leaf folder	<i>Marasmia exigua</i> (Butler)
	Brown Plant Hopper	<i>Nilaparvata lugens</i> (Stal)
	Rice Armyworm	<i>Spodoptera mauritia acronyctoides</i> (Guenée) & <i>Mythimna seperata</i> (Walker)
Taro	Taro beetle	<i>Papuana uninodis</i> L.
	Taro armyworm, taro cluster caterpillar	<i>Spodoptera litura</i>
	Red spider mites	Tetranychus spp.
Coconut	Coconut rhinoceros beetle	<i>Oryctes rhinoceros</i>
	Coconut stick insect	<i>Graeffea crouanii</i>
Banana	Banana scab moth	<i>Nacoleia octasema</i>
Sweetpotato	Sweetpotato weevil	<i>Cylas formicarius</i>
<u>Vegetables</u> Eggplant Head cabbage, Chinese cabbage Tomato	Melon thrips Diamond back moth Corn earworm	<i>Thrips palmi</i> Plutella xylostella Helicoverpa armigera

B) Diseases

Crop	Common disease name	Scientific name
<u>Vegetables</u> Chilli	Chilli anthracnose	<i>Colletotrichum acutatum</i> , <i>C. gloeosporioides</i> & <i>C. scovillei</i> <i>Colletotrichum acutatum</i> , <i>C. gloeosporioides</i> & <i>C. scovillei</i>
Tomato Eggplant Chilli Capsicum	Bacterial wilt	<i>Ralstonia solanacearum</i>
Slippery cabbage	Hibiscus cabbage wilt	<i>Phytophthora nicotianae</i>

Banana	Banana bunchy top	<i>Banana bunchy top nanavirus</i>
	Black Sigatoka, black leaf streak	<i>Mycosphaerella fijiensis</i> (sexual state) & <i>Paracercospora fijiensis</i> (asexual state)
Kava	Kava dieback	Cucumber mosaic virus
Watermelon	Gummy stem blight	<i>Didymella bryoniae</i>
Cocoa	Black pod	<i>Phytophthora palmivora</i>
Ginger	Ginger burrowing nematode	<i>Radopholus similis</i>
Papaya	Phytophthora fruit & root rot	<i>Phytophthora palmivora</i>
Cucurbits (cucumber, melon, pumpkin, zucchini)	Cucurbit powdery mildew	<i>Sphaerotheca fuliginea</i> or <i>Erysiphe cichoracearum</i>