

J.C. CHANG/CAROTINO GROUP

Environmentally Sustainable Palm Oil Production

Welcome from the Chairman...

Dear Reader

The J.C. Chang/Carotino Group has been involved in the palm oil industry since the 1970s. In that time, we have grown from a small company to a world leader in producing ethically and environmentally responsible value added and differentiated palm oil products for the global market place.

We are very proud of our tradition as innovators and pioneers in the industry and continue to lead the way when it comes to cutting edge technology, environmental issues and corporate social responsibility.



The Group's vision is to balance the '3Ps' – consideration for 'People, Planet and Profit' in all its management decisions and operations in order to achieve these goals.

We are delighted that the concept of sustainability is now universally recognised, accepted and indeed widely practiced.

As early members of the Roundtable for Sustainable Palm Oil (RSPO), we have always held environmental concerns very dear. Since its earliest origins, the Group has implemented good agricultural practices, adopted soil and water conservation programmes, followed eco-friendly integrated pest control methods and maintained harmonious relationships with local communities.

As the importance of sustainability as a global issue has increased, we have maintained our leading position at the forefront of environmentally sustainable palm oil production. We are proud to be able to offer to the market a range of RSPO Identity Preserved, Segregated and Mass Balance palm products from Refined Palm Oil, Red Palm Oil, Palm Phytonutrients and Oleochemicals.

Few, if any of our rivals in the palm oil industry can currently claim this distinction. We have invested significant amounts of time and money in achieving this leading position because sustainability goes to the core of what we believe in and aspire to as a company.

Our mission is to strive for continuous improvements along the entire supply chain from the farm to the market, in performance and profitability through management procedures and operations which are economically viable, environmentally appropriate and socially beneficial.

Introduction

In today's rapidly developing world, maintaining the delicate ecological balance and caring for the world around us has become increasingly important. At the J.C. Chang/Carotino Group, care for the environment is at the heart of everything we do.

As owners and custodians of thousands of acres of oil palm plantations across Malaysia, we constantly strive to make a positive contribution to both the local and wider environment. We use every means at our disposal to promote a harmonious relationship with the natural world.

We are proud to be early members of the Roundtable for Sustainable Palm Oil (RSPO) and are leading the field in sustainable palm oil production. We were also one of the earliest groups in Malaysia to receive MSPO certification (Malaysian Sustainable Palm Oil) as a commitment to the national cause of being an environmentally responsible country.

The Group takes its responsibilities to both the environment and the global community very seriously and has put this obligation at the centre of its corporate philosophy.

As a caring and responsible corporation, the Group balances the need to satisfy its customers by producing premium quality products using the latest state-of-the art technology with a dedication to environmental sustainability in every aspect of its business.

Contents

- 2 Welcome from the Chairman
- 3 Introduction and Contents
- 4 About the J.C. Chang/Carotino Group
- 5 Our Corporate Environmental Policy
- 6-7 Our Product Range and Applications
- 8 Enffue Biodiesel
- 9 RSPO Supply Chain Systems
- 10 Biodiversity in Oil Palm Plantations
- 11 Integrated Pest Management
- 12 Forest Conservation
- 13 Protecting Habitats and Endangered Species
- 14 Best Management Practices
- 15 Good Agricultural Practices
- 16 Corporate Social Responsibility
- 17 Partnership with Neighbourhood Communities
- 18 Health and Safety A Primary Concern
- 19 Environmentally Responsible Industry
- 20 Caring for the Global Community
- 21 Carotino Enriched Biscuits
- 22-23 International Research Projects







An open park area on one of our plantations.



Palm plantations are home to many native species of birds and other wildlife.



Plants and insects add to the overall biodiversity of the plantations, which are rich in flora and fauna.



Our Product Range

The Group's vision is to grow as a multi-national company dealing in value-added food, neutraceuticals, pharmaceuticals, oleochemical products and environmentally friendly fuels, all derived from RSPO certified sustainable palm oil.

Consumer Products

- Carotino Red Palm Fruit Oils are rich in Phytonutrients such as Natural Carotenes,
 Tocotrienols and Tocopherols (Vitamin E). The range includes Carotino Premium and
 Carotino Classic, as well as a range of pure red palm fruit oils. These products are sold
 all over the world, including Europe, Asia, the USA, Australia and Africa.
- Carotino BetterGhee is our flagship vegetable ghee made from Red Palm Fruit Oil with aromatic butter flavour.

Food Service and Industrial Products

- Carotino Margarine and Carotino Shortening are formulated to enhance the texture of baked products, while Carotino Butter Oil Substitute (BOS) replaces butter in a range of applications. BOS is specially formulated from red palm oil and is suited for making breads, cookies, crackers, pastries, cakes and other bakery products.
- Carotino produces a range of natural vitamin-rich oils, oleins and superoleins for use in
 a wide variety of food manufacturing processes. These products can be used as natural
 colourants in products like potato crisps, fries, pastas, noodles and snacks.
- Carofry is a vitamin-rich, golden frying oil for use in commercial catering.

from nature



and Applications

Neutraceuticals and Animal Feed

- Carotino Phytonutrient mix can be used for food applications like dietary supplements, colourants, ingredients in personal care products and animal feed applications.
- Carotino Natural Carotenes and Natural Tocotrienols can be used in food supplements such as vitamin softgels or capsules and fortified foods, as well as for use in cosmetics and personal care products.

Oleochemicals

- The Group produces Methyl Esters for conversion to high quality detergent intermediates like Methyl Ester Sulphonates (MES), Methyl Ester Ethoxylates (MEE), Fatty Alcohols etc.
- Carotino Palmitic Methyl Ester C16ME and Carotino Oleic Methyl Ester C18ME are down stream products of the palm oil trans-esterification process. C16ME is used in making environmentally friendly and biodegradable detergents and C18ME is processed to make personal care, cosmetics, industrial and pharmaceutical products.
- C16 & C18 Methyl Esters can be hydrogenated to form fatty alcohols, including Stearyl Alcohol; Oleyl Alcohol; Linoleyl Alcohol and Cetostearyl; Cetearyl or Cetylstearyl Alcohol. These can be used in a number of ways depending on the formulation, eg: emollients, emulsifiers, thickeners, stabilisers, opacifying agents, viscosity increasing agents, foam boosting surfactants and solvents, to name only a few. Methyl Esters can also be used to make drilling fluid for the drilling industry.









Our Portfolio also includes...



Biodiesel - The Environment Friendly Fuel

Biodiesel is a bio-degradable, environmentally friendly fuel derived entirely from renewable natural sources such as palm oil and is viewed as a long term alternative to traditional petroleum based fuels.

The J.C. Chang/Carotino Group was the first company in the world to set up a fully integrated palm biodiesel plant. The Group's biodiesel brand is called Enffue (Environment Friendly Fuel) and the Enffue plant leads the world in palm biodiesel. It was the first to produce winter grade palm biodiesel which can be used in temperate climates.

Enffue applies the same 'green' principles which guide the Group's other business interests to producing ethically sourced, environmentally sustainable palm biodiesel to help meet the biodiesel requirements of the 21st century.

Enffue is an environmentally friendly alternative to fossil fuel. Rail, road, air and marine transport can all run successfully on Enffue biodiesel.

RSPO Supply Chain Systems

RSPO certified palm oil is internationally recognised as the 'gold standard' by which sustainable palm oil is judged. RSPO certified products are guaranteed to be ethically sourced and environmentally sustainable.

The J.C. Chang/Carotino Group was an early member of the RSPO and has been producing environmentally sustainable palm oil to the highest international standards for many years and is a key player in the sustainable palm oil market. It strives to be an industry leader and offers a wider range of sustainable, RSPO certified products than any other palm oil manufacturer.

The Group has the unrivalled ability to produce a range of products to all standards, including RSPO Mass Balance, RSPO Segregated and even RSPO Identity Preserved.



Tunera Subulata plants are the host plants of several predatory insects.



Bull-frogs are found in damp, low lying palm fields.

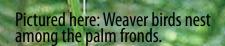


Hunting and fishing of wildlife are prohibited within our plantations.

Biodiversity in Oil Palm Plantations Palm plantations are home to a wide variety of animal species, from the tinjest insects and spiders to larger mammals such as monkeys as

the tiniest insects and spiders to larger mammals such as monkeys as well as thousands of other creatures including birds, snakes, lizards, rats, frogs and squirrels.

They also provide perfect habitats for many different plants, flowers and fungi which thrive among the trees and add to the unique biodiversity of the palm environment.



Integrated Pest Management

The Group takes every possible step to encourage this natural diversity and protect the delicate ecological balance of the area.

Among the steps it takes is to implement an integrated pest management programme, which includes:

- Emphasising the use of both biological and cultural practises to judiciously reduce and minimize the use of pesticides.
- Encouraging natural pest control methods such as providing nesting boxes for barn owls
 and encouraging the proliferation of snakes, iguana and eagles to kept the rat population
 under control.
- Installing pheromone traps and cultivating leguminous covers to reduce and control attacks by the Oryctes Rhinoceros beetle on immature plants.
- Planting species such as Cassia Cobanensis, Tunera Subulata and Antigonon Leptopus to increase the number of predatory insects which control leaf-eating caterpillars and bag worms.
- Using only environmentally safe chemicals and methods of application whenever pesticides are necessary for supplementary control.



Predatory insects are encouraged to reduce pests naturally.

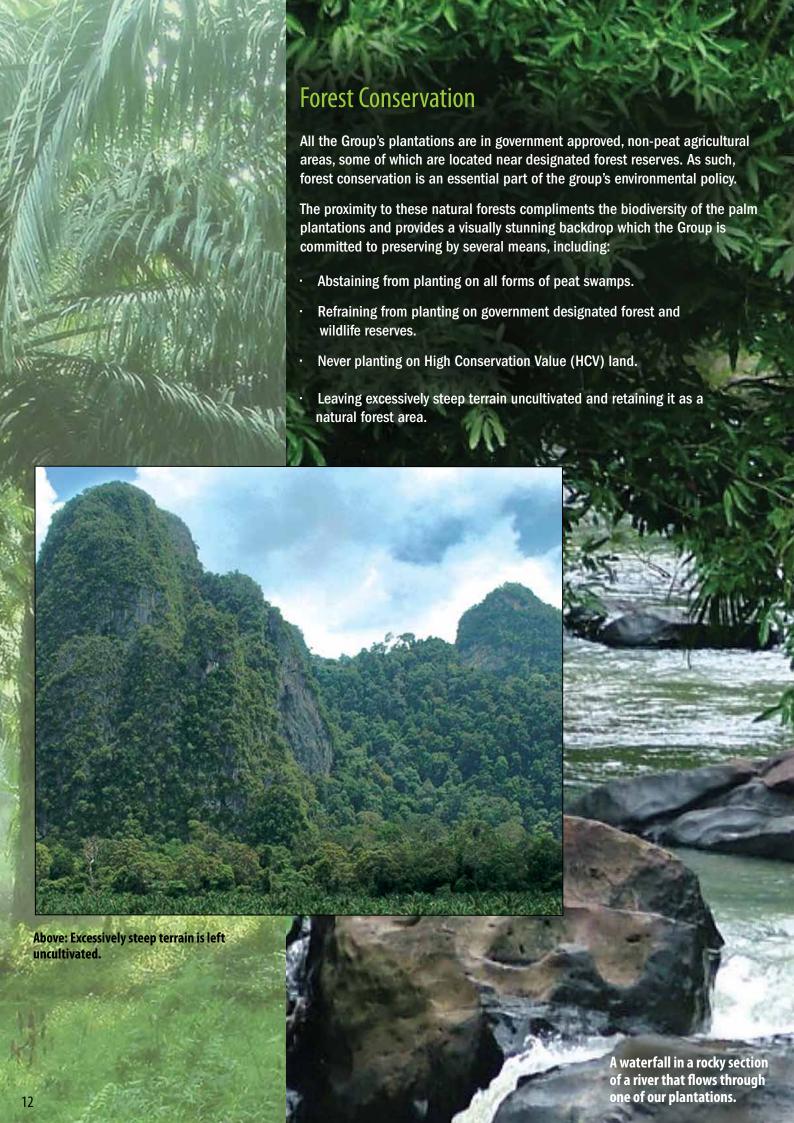


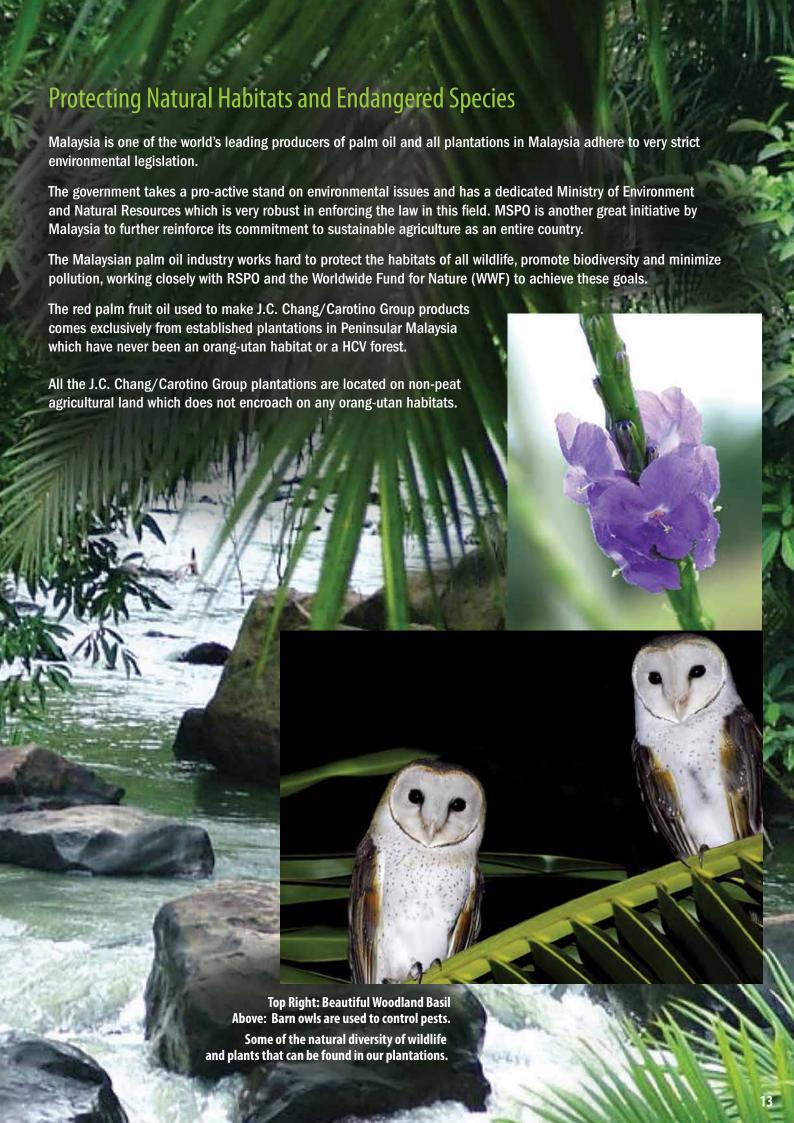
Owls are natural predators of rats and other vermin which can harm native wildlife.



Wherever possible, natural solutions are found to deter pests.







A plantation worker monitors palm trees on one of our sites.

New plants are carefully reared on our plantations before being replanted elsewhere on the site.

Best Management Practices

As part of its commitment to promoting plant and animal diversity in its plantations, the Group follows Best Management Practices to ensure that the land is responsibly managed and maintained.

These practices include:

- Maintaining balanced ground vegetation and soil conditions to stimulate natural soil flora and fauna.
- Practising a zero burning policy and instead burying all felled and shredded trunk chips from old palm trees.
- Replacing felled palms with new and vigorous high yield seedlings to promote optimal ground conditions.
- Supplementing soil fertility with natural fertiliser to encourage robust palm growth and yield.
- Using traditional buffalo and cart transport for crop gathering to minimise carbon emissions through non-usage of fossil fuel.
- Use of Enffue Biodiesel instead of petroleum diesel in diesel vehicles used in the plantations.



Good Agricultural Practices

As part of its commitment to promoting plant and animal diversity in its plantations, the Group follows Good Agricultural Practices to ensure the land is responsibly managed and maintained.

Following Good Agricultural Practices ensures that the delicate eco-system of the palm plantations is maintained, helping to prevent soil erosion, preserve soil fertility and conserve moisture.

These include:

- Constructing terraces, silt pits and cultivating Macuna Bracteata leguminous covers to minimise soil erosion and check weed competition.
- Ensuring that rain water running off road surfaces is diverted into channels which take it directly onto the terraces and fields.
- Encouraging the proliferation of desirable low soft grasses between rows of palm trees to increase water infiltration and reduce surface run-off.
- Spreading palm frond piles low and wide to conserve moisture and distribute organic carbon more evenly between palm rows.
- Placing pruned fronds along the natural contours of the slopes to reduce the speed of water flowing down hills.
- Turning all forms of palm waste from the mills into compost as an organic nutrient and carbon source for the palm trees.
- Maintaining balanced ground vegetation and soil conditions to stimulate natural flora and fauna.

Optimizing soil fertility to encourage robust palm and growth yield.



Beneficial grasses alternate with palm fronds to minimise soil erosion and maximise moisture conservation.



Drain sides are protected by luxuriant spread and growth of Mucuna Braceata ground covers.



Rainwater is channelled into drainage ditches to preserve water for irrigation.



A workers village on one of the Group plantations.

Plantation workers take great pride in their



The spacious interior of a typical plantation worker's home.

Corporate Social Responsibility (CSR)

Commitment to the Local Community and Workforce

As well as being dedicated to its environmental responsibilities, the J.C. Chang/Carotino Group is a caring employer, a responsible landowner and aims to be a conscientious corporate citizen.

The majority of the Group's agricultural employees live and work on the plantations and the health and welfare of staff and their families are of fundamental importance to the company.

To ensure that its plantations are harmonious places to live and work, the Group has created thriving and dynamic communities which enhance the lives of employees and their families.

The company provides a wealth of facilities which meet their needs, such as providing good quality housing, as well as catering for their educational, spiritual and social requirements.



Partnership with Neighbourhood Communities

The Group works in partnership with neighbourhood communities to enhance the lives of the people who live in them. Amenities for workers include:

- Comfortable two and three bedroom living accommodation in attractively landscaped settings.
- Community halls for social functions.
- Places of worship for spiritual fulfilment.
- · Good quality schools and crèches for workers' children.
- Games and sports facilities for leisure and relaxation.
- Medical facilities for basic health care and emergencies.
- Water treatment plants to provide clean, treated water.

One example of support for local communities was the construction of a mini hydro power generation project in collaboration with the Sabah Electricity Board. Another example was the donation of water tanks to the local community.



A volleyball court is one of the many leisure facilities available to workers.



An enthusiastic class in one of our Humana schools.





A water treatment plant to filter and treat water for consumption by the local community.

Workers are trained on the correct techniques of applying different types of fertilisers.

A well-equipped clinic provides for the basic medical needs of workers on our plantations.



Plantation workers are given regular training and refresher courses on health and safety.

Health and Safety — A Primary Concern

In addition to providing clean, comfortable and well-designed communities in which to live and work, the Group ensures that all its staff are well trained in health and safety issues to ensure an excellent working environment.

The Group invests in personnel training and contributes socially and economically to local neighbourhood communities through:

- Regular on-the job and formal training for staff and workers.
- Training in Health and Safety Procedures and Food Safety measures.



Environmentally Responsible Industry

The Group's commitment to the environment, nature and its employees is not confined to its plantations alone, but includes its palm oil processing mills and downstream manufacturing activities.

The mills are shining examples of good practice in the palm oil industry in terms of environmentally responsible manufacturing. Mill environments are clean and well maintained and provide employment for numerous people from the surrounding areas.

The latest 'green' solvent-free technology is used at the mill to produce an environmentally friendly product with minimal impact on nature.

The Group's mills pride themselves on deploying the latest state-of-the-art effluent treatment technology which includes biogas trapping thereby reducing Methane Gas emissions to improve its greenhouse gas (GHG) foot print and all discharge conforms to national environmental regulations.

In 2014, a new Carotino Mill Biogas Plant was commissioned to reduce pollution and GHG emissions from mill operations. Biogas is formed from the decomposition of organic waste material and can be used to produce heat and electricity. It is considered a renewable fuel source and the construction of the mill is a further example of the Group's commitment to sustainability across its operations.





All Carotino/JC Chang's manufacturing facilities meet the highest international standards.



A routine daily inspection of one of our crude palm oil tanks.



A dedicated biogas plant is used to generate power and reduce diesel usage at our mill.



Caring for the Global Community

As part of its commitment to corporate social responsibility, the Group is active in numerous high level projects worldwide which aim to enhance the diet and nutrition of tens of thousands of people in the developing world.

The Group's red palm oil plays a vital role in many of these international projects as its high alpha and beta carotene content (Pro-Vitamin A) and other naturally occurring nutrients are capable of making significant improvements to the diets of malnourished people.

Case Study — Carotino Enriched Muffins

Nutritional deficiencies pose a major problem in developing countries and this so-called 'hidden hunger' is highly detrimental to the health of the population — particularly children.

Vitamin A deficiency is a particular problem as it impacts general health, vision, immunity, growth, foetal development and cognitive and mental performance.

Red palm oil is considered to be the world's richest plant source of natural carotenes (Pro-Vitamin A) and a rich source of tocotrienols (Vitamin E).

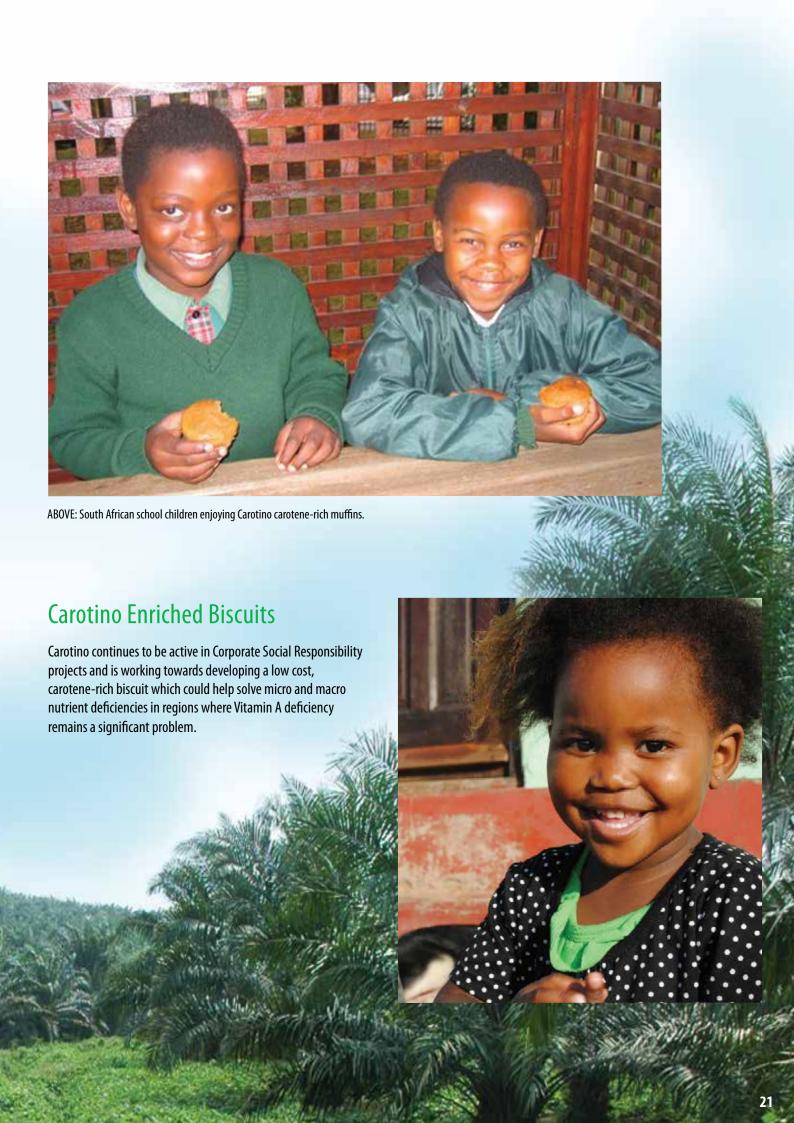
The need for fortified food products to combat Vitamin A deficiencies prompted the South African Medical Research Council (MRC) to scientifically evaluate the use of red palm oil in snacks.

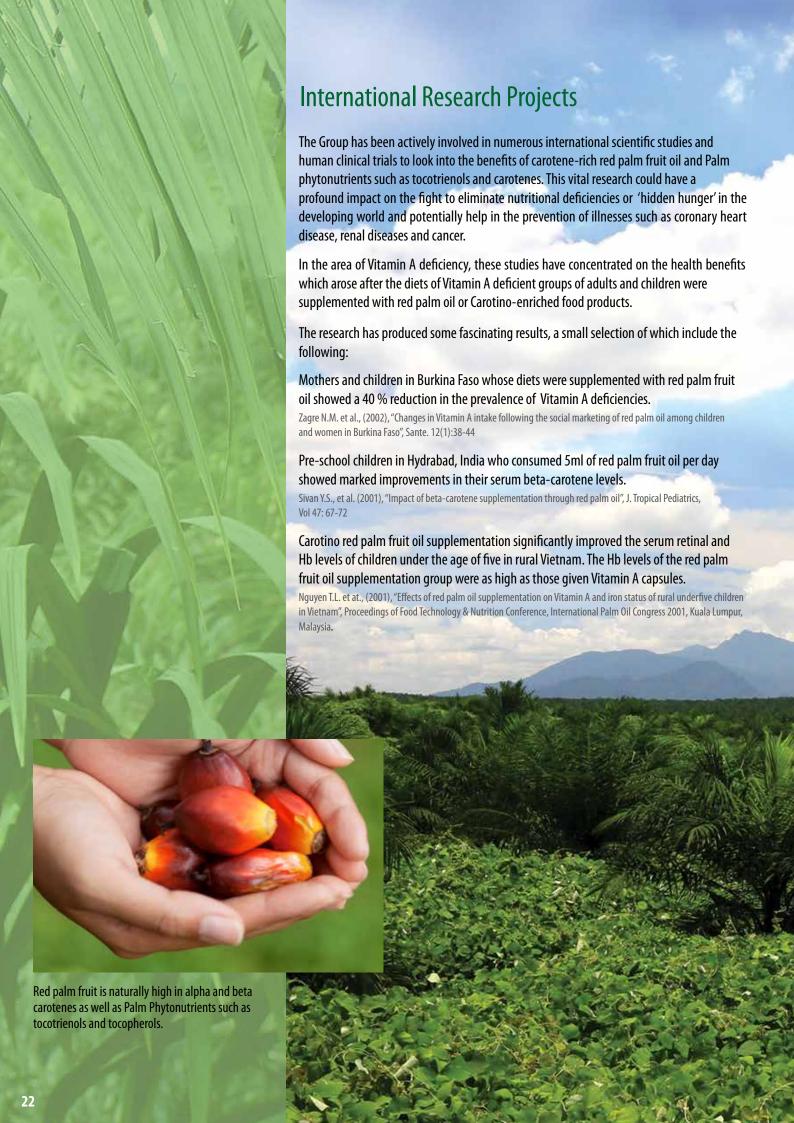
The Nutritional Intervention Research Unit (NIRU) of the South African MRC worked with Carotino to carry out a long term nutritional intervention study to prove the value of Carotino red palm fruit oil in bakery products. This landmark study has been well documented in the UN Food and Nutrition Bulletin.

Carotino joined forces with the Malaysian Palm Oil Council (MPOC) in a successful community development project to develop self-sustaining bakeries in South Africa to sell carotene-rich muffins to local school children.

The aim was to combat Vitamin A deficiency in children and adults as well as giving people running the bakeries valuable life and business skills and generating funds for disadvantaged schools.







Bangladeshi children suffering from respiratory infections and diarrhoeal diseases showed significantly increased serum retinol levels after their diets were supplemented with biscuits made with Carotino red palm fruit oil.

Ali S.M.K. et al. (2001), "Beta carotene to combat acute respiratory tract infection and diarrhoea disease in slum children of Dhaka, Bangladesh", Proceedings of Food Technology & Nutrition Conference, International Palm Oil Congress 2001, Kuala Lumpur, Malaysia

Mothers in Honduras who consumed Carotino red palm oil showed significant increases in alpha and beta carotene levels in their breast milk and the infants who were breast-fed by these mothers also had significantly higher serum retinal levels.

Canfield L.M. et al., (2000) "Red palm oil in the maternal diet improves the vitamin A status of lactating mothers and their infants", Food and Nutrition Bulletin, Vol 21(2): 144-148

Volunteers aged over 35 years old with cardiovascular risk factors supplemented with tocotrienols for two years were found to have their mean White Matter Lesion volume remained essentially unchanged whereas those in the placebo group increased.

Gopalan et al. (2014). "Clinical Investigation of the Protective Effects of Palm Vitamin E Tocotrienols on Brain White Matter", Stroke. 2014; 45:1422-1428

Patients undergoing chronic haemodialysis supplemented with Tocotrienol Rich Fraction were found to have lower plasma triglycerols and higher HDL cholesterol after 16 weeks intervention.

Zulfitri A Mat Daud et al. (2013). "Vitamin E tocotrienol supplementation improves lipid profiles in chronic hemodialysis patients", Vascular Health and Risk Management 2013:9747—761

Hypercholesterolaemic adults with ultrasound-proven Non-Alcoholic Fatty Liver Disease showed hepatoprotective effect when treated with Mixed Tocotrienols.

Magosso et al. (2013) "Tocotrienols for normalisation of hepatic echogenic response in nonalcoholic fatty liver: a randomised placebo-controlled clinical trial". Nutrition Journal 2013



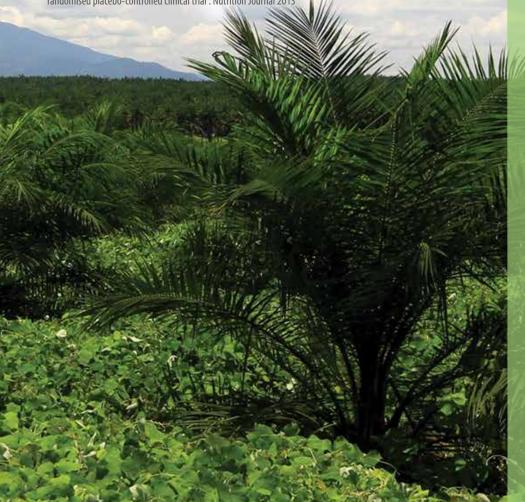
Mothers and babies in a number of countries have taken part in clinical trials using red palm fruit oil to boost their Vitamin A levels.



Supplementation with red palm fruit oil has helped children suffering from a range of diseases.



Children in several developing countries have benefited from having their diets supplemented with red palm fruit oil.







Headquarters

Carotino Sdn. Bhd. PLO 519, Jalan Besi Satu Pasir Gudang Industrial Estate 81700 Pasir Gudang Johor Darul Takzim Malaysia

T +(607) 252 2888

F +(607) 252 2999

EU & UK

Carotino (EU) Limited Carotino House Bury Lane Rickmansworth WD3 1ED United Kingdom

T +44 (0)1923 497133

F +44 (0)1923 497134

Australia

Carotino Australia Pty Ltd. 18 Jubilee Avenue Warriewood NSW 2102 Australia

T +61 (0)2-9997 1466

F +61 (0)2-9979 1696