# Buffel Grass Invasion: Nutrition and Food Security

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# Introduction

This presentation explores the impacts of buffel grass invasion on food security in central Australia and why this is such a critical health issue.

It looks at the value of local foods and how buffel grass impacts access to these.

Buffel grass has been planted and spread in central Australia to support the beef industry. This presentation also explores:

- Beef production in central Australia
- Whether buffel grass actually increases the productivity of this industry

We ultimately ask the audience to consider whether they think buffel grass leads to or undermines food security in central Australia.

# What is Buffel Grass and Why Are We Surrounded By It?

Buffel grass (*cenchrus ciliaris, c. pennisetiformis*)

Perennial tussock grass

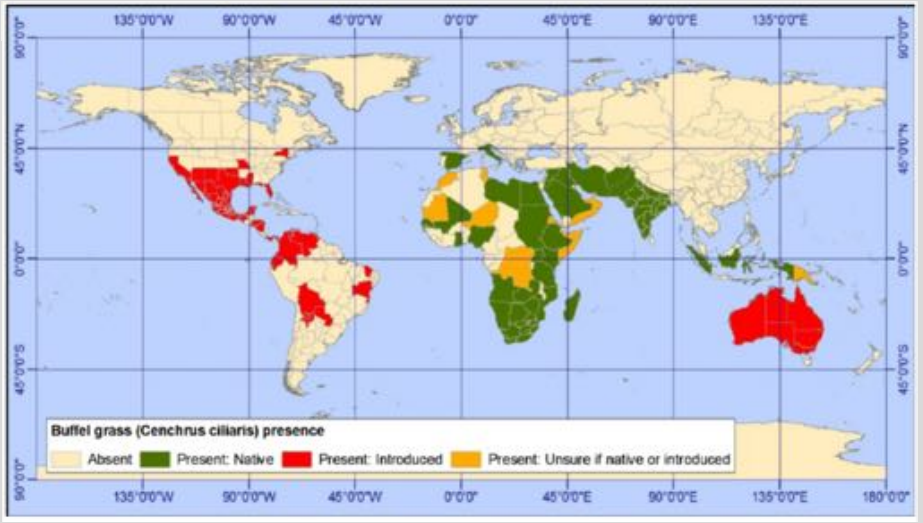
Native to parts of Africa, the Middle East and India[1]

Widely planted to support colonisation and beef production[2]

Highly invasive - continues to spread far beyond planted areas[3]

Dominates many landscapes[4]

- Extensive areas of the Central and Barkly regions
- Found in all regions of the Territory



# UMUWA STATEMENT ON BUFFEL GRASS

HEALTHY COUNTRY - NO BUFFEL GRASS

BUFFEL CHOKING COUNTRY

Ngenana Anangu tjutangku tjanpi kunanya nyanga pakunya ngaya kalintja wiyaku. Piku kuwari tjanpi kunanya ngananpa manpangka ngananyi munu nganampa ngura kuwiri munu community munu culture kulu.

Tjanpi kunanya ngaya kalintju ankula tjutaku kutju mai munu ulpuru kulu wiyanyi(kitjanguku. Panya kuwari tjanpi kuranya ala tjamtju munu kuntanu nganampa ngurangka. Ka nganana kuwari puru ngurini mai puntja tjuta. Panya tjala, malu, kampurarpa, wintry wirinypa, ahulunypa, wanpiunu, kattu-kattu, wingun kuwu munu puru puntja kutjupa tjuta kutju panya kuwari nganana puru ngurini munu nganampa tjutjunti(kitjunpa munu munyti) kulu wiyalingu.Tjanpi kunanya wararungkula pulkanthiguku wararungku kampanyangku munu nalintjiku puunyangku. Ka nganana nyanga pakunya ngaya kalintja wiyaku panya tjanpi nuxu nyanga pakunu panya wiru wiru puka mulapa. Ku nganana mukuringanyi alpamilantjaku nganampa ngura nalangkungku wiru kanyintjaku. Ka kuwari tjitji pampa tjuta ulanji ngura nyanga pakuntja. Panya kuwari ngura puka tuta wiyanu tjanpi kunatu panya,aunu wiru tjuta pakanitjangka.

Panya nganana kuwari tjitji tuta kalintja wiyaningu pukkutu panya tjanpi kunatu wara pakinu munu punu nganampa pakanitja tjuta wiyaku. Ka nganampa tjitji tjutangku kuwari autu nyanganyi panya tjanpi kunatu uwankara pakinu munu kuwari wiru wiru puka ngananyi panya nganampa tjitji tuta nintintjaku. Ka nganana nyanga pakunya ngaya pakunya ngaya kalintja wiyaku. Panya nganampa culture kuwari kuwiri, ka ananga tjutu kuwari (ntunu tjitunu nyinanyi. alpamilantjaku. Munu nganana kuwari mapaya pukna tjutangka tjapiti nyanga pakunya nyakumpaku, panya kuwari kuwiri tjanpi kunatu nganampa nguarangka munu nganampa ngura pukka tuta kulu. Nyanga pakunya ngura nganampangku wiyantjaku.

Ka nganana Anangu tjuta tjunjunitjaku tjungungku tjayanma tjanpi kura nyanga pakunya wiyantjintjangku. Panya watka pukka mulapa nyangatja ngananyi tjanpi kunanya wiyanytjaku.Ka nganana mukuringanyi government kulu nganananya mulo mulangku pukanu alpamilantjaku.Ka nyanga pakunya nganana mukuringanyi tjanpi kunanya alpamilantjaku. Munu tjanpi kuna nyanga pakunu anu ngura wiinkkunu, munu tjinmininga tjanpangu, munu kitji tjutaku inkalanitjaku kulu.

Ka kitji tjuta nganmanypa,para wiri(pakalakal pukutja munu inkapa. ka kuwiri wiyaningu. Ka tjanpi kura nyanga pakuta. Inu tjalatja munu kumpitja nganpa ka tjitja pampa tjana kulu kutnta ngananingkupai tjanpi nunatu anganyangka ka nganana nyanga pakuta tjanalanguku pikatjaranngkupai ngakatjaranningany panya tjanpi ngia anangu tjuta kuwiri ngukuringany pikatjaranngkutjakutjakara Panya nganana mukuringanyi pukkara alpamilantjaku nganampa ngurangku. Ka nganana kuwari pukara mukuringanyi government uwankaranglku nganananya kulnnjaku munu alpamilantjaku tjanpi kura nyangpakunya wiyantjaku. Panya nganaru warangku wangkungi tanpi kura nyanga pakunya palu mula mulangku nganananya kulnnja wiyaku.

Ka nganana nyanga pakunya mula mula wangkara pakanitjaku ngananyi. ngura nganampa. culture munu community kulu nuhaku nganandaku. Ka nganana mukuringanyi. government kanpi kura nyangapakulangunu.

Translated by Langakili Robin Joanna Ash and Glenn Barry

# Excerpt from the Umuwa Statement[5]

...Buffel grass was brought to our country to feed cattle and keep down the dust. But it has spread across much of our land. It is choking our country. **We can't get bushfoods where we used to. Honey ant, malu (kangaroo) and our native plants are getting harder to find.** Our wildflowers are disappearing. The Buffel grows too fast and burns too often for our country. It's the first plant that grows after rain and fire. It is killing our country and while we didn't bring it here, **we live with the consequences**...

Older people mourn for the country that used to be...

**Buffel where once many native plants grew**. We can't take our kids out to learn culture, **the hunting tracks are covered and the plants that sustained us for thousands of years are disappearing**. Our kids are growing up seeing only country with Buffel grass and it's getting harder to teach our kids the stories for this country. It is threatening our culture, we didn't bring it here and our **people are suffering the consequences...**

# Film of Rene Kulitjia Talking About Buffel Grass[6]

https://www.youtube.com/watch?v=rWx_vpSaKSI

Native Edible
Plants and Animals

LOCAL
FOODS

# Nutrition - Native Foods

Central Australia's natural ecosystems include extremely diverse and healthy food sources[7].

- Low in energy density
- High in nutrient density – proteins, complex carbohydrate, micronutrients, vitamins, minerals and antioxidants

# Buffel Grass Invasion - Impacts on Native Foods

Kills animals through habitat destruction, incineration, starvation, dehydration and exposure[8] [9]

Destroys grasses (grains) and plants (vegetables, fruits and seeds)

- Competes with and displaces native plants[10]
- Alters and erodes soils[11]
- Changes water flow[12]
- Causes very hot, widespread, frequent fires[13]
- Endangers, and contributes to the extinction, of biotic pollinators[14]

# Buffel Grass Invasion - Impacts on Food Management

Buffel grass also negatively impacts the way people have cultivated food for thousands of years[15] [16] [17]

An example is interfering with the use of fire to promote, distribute and protect edible plant and animal communities.

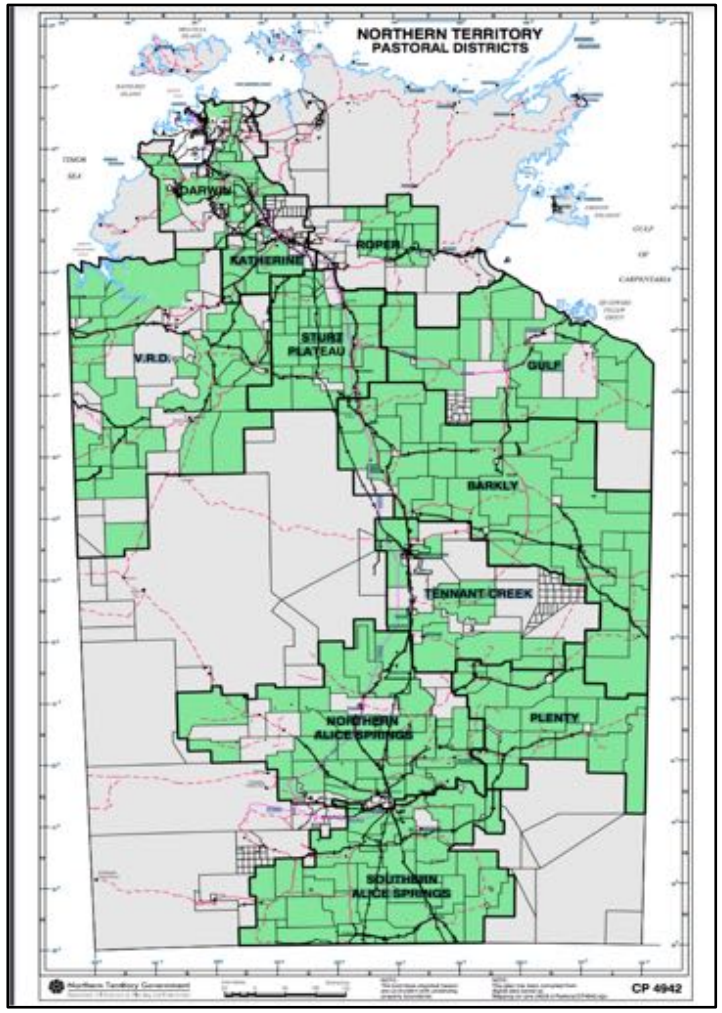
# Beef Production

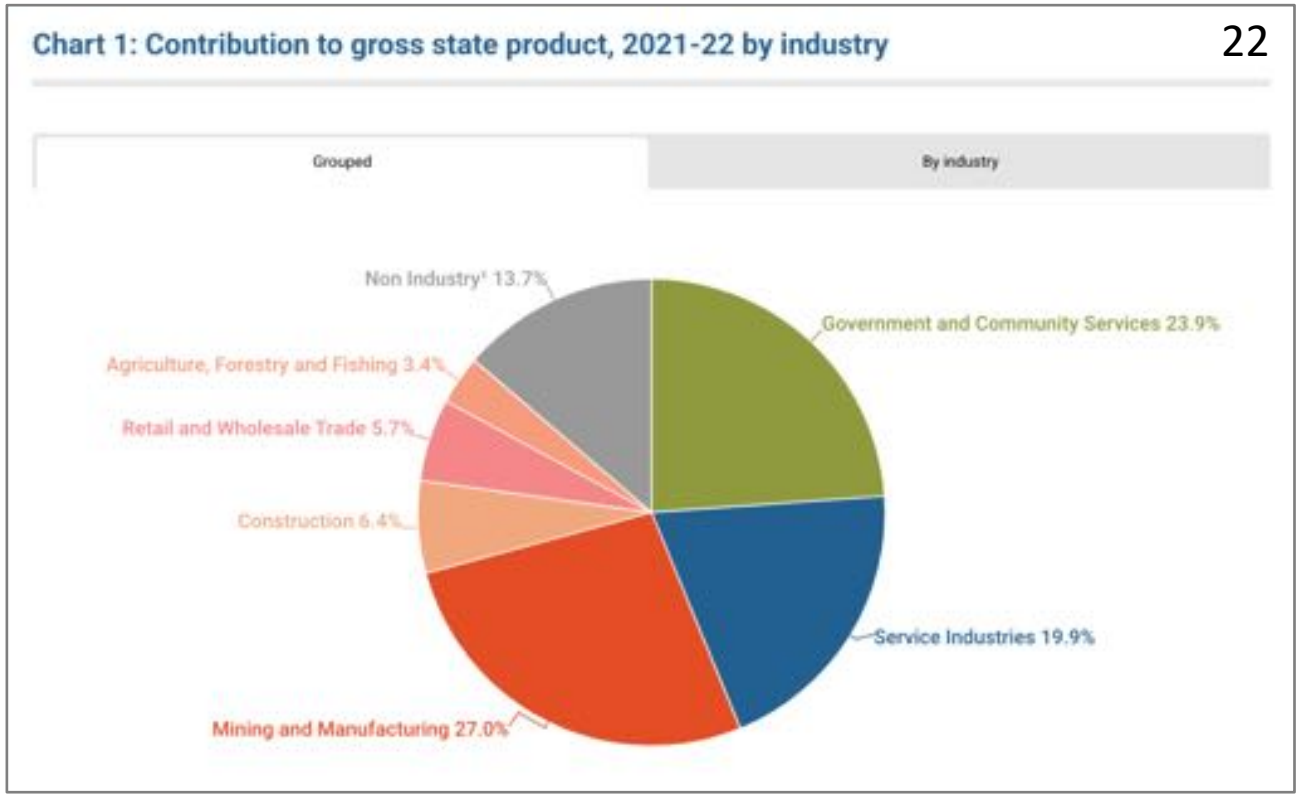
Buffel grass was (and is still) planted and spread to support this industry[19, 20]

- As pasture
- To mitigate some forms of soil erosion that result from stocking (and other industrial activity)

# The Northern Territory Pastoral Industry

Over 52% or 700 000 km$^2$ of the NT is leased for ***sustainable*** pastoral purposes[21]



# Pastoral Industry Productivity Central Australia

Current area: Central Australia | Current benchmark: Northern Territory | Comparison year: 2018/19 | reset

Value added by industry sector | reset | export

| Central Australia | 2023/24 | | | 2018/19 | | | Change |
|---|---|---|---|---|---|---|---|
| Industry | $m | % | Northern Territory¢ | $m | % | Northern Territory¢ | 2018/19 - 2023/24 |
| Agriculture, Forestry and Fishing | 126.3 | 3.8 | 4.5 | 80.3 | 2.8 | 4.0 | +46.1 |
| Mining | 553.2 | 16.8 | 34.0 | 560.6 | 19.4 | 29.6 | -7.4 |
| Manufacturing | 87.9 | 2.7 | 2.6 | 78.1 | 2.7 | 4.9 | +9.8 |
| Electricity, Gas, Water and Waste Services | 52.6 | 1.6 | 1.6 | 39.6 | 1.4 | 1.7 | +13.0 |
| Construction | 117.4 | 3.6 | 6.6 | 142.9 | 5.0 | 7.3 | -25.5 |
| Wholesale Trade | 107.8 | 3.3 | 2.9 | 81.3 | 2.8 | 3.4 | +26.4 |
| Retail Trade | 122.9 | 3.7 | 3.1 | 121.9 | 4.2 | 3.1 | +1.0 |
| Accommodation and Food Services | 149.4 | 4.5 | 2.4 | 139.1 | 4.8 | 2.7 | +10.2 |
| Transport, Postal and Warehousing | 192.5 | 5.9 | 4.4 | 152.0 | 5.3 | 4.8 | +40.5 |
| Information Media and Telecommunications | 18.1 | 0.6 | 0.4 | 17.8 | 0.6 | 0.4 | +0.3 |
| Financial and Insurance Services | 67.0 | 2.0 | 2.5 | 57.1 | 2.0 | 2.5 | +9.9 |
| Rental, Hiring and Real Estate Services | 43.9 | 1.3 | 1.4 | 48.8 | 1.7 | 1.5 | -4.9 |
| Professional, Scientific and Technical Services | 140.3 | 4.3 | 3.0 | 141.4 | 4.9 | 4.6 | -1.2 |
| Administrative and Support Services | 70.9 | 2.2 | 2.1 | 75.2 | 2.6 | 1.9 | -4.3 |
| Public Administration and Safety | 409.0 | 12.5 | 10.8 | 355.7 | 12.3 | 11.6 | +53.2 |
| Education and Training | 206.1 | 6.3 | 5.2 | 206.8 | 7.2 | 5.2 | -0.7 |
| Health Care and Social Assistance | 683.2 | 20.8 | 9.1 | 468.2 | 16.2 | 7.8 | +215.0 |
| Arts and Recreation Services | 48.9 | 1.5 | 1.3 | 46.7 | 1.6 | 1.2 | +2.3 |
| Other Services | 86.3 | 2.6 | 2.0 | 72.3 | 2.5 | 1.9 | +14.0 |
| Total industries | 3,283.7 | 100.0 | 100.0 | 2,885.9 | 100.0 | 100.0 | +397.8 |

Stocking rates very low (with or without buffel)

- Typically recommended approximately 2 animal equivalents per kilometre squared[23,24]

- Contribution to Territory Gross Domestic Product low – 3.8%
  - $126.3 million of total $3.3 billion[25]

# Does buffel grass increase the productivity of this industry?

## Positives

- Grows rapidly under certain conditions[26]
- Extensive root system can withstand trampling and heavy grazing by stock[27]
- More drought tolerant than some other introduced pasture grasses[28]

## Negatives

- Palatability = moderate (at best)[29]
- Nutritive value = moderate (at best)[30]
- Quality decreases significantly during drought[31]
- Increases frequency and intensity of fires - can significantly increase risk of stock losses through fire
- Can cause oxalate poisoning in stock[32]
- Susceptible to pests and diseases such as pasture dieback[33,34]
- Over time can get 'rundown' - within 20 years pasture production and animal live weight gain can reduce by as much as 50%[35,36]

# Productive Pasture

Resilient, nutritious, palatable pastures are made up of a diversity of plants that are well adapted to, and keep in balance, with natural ecosystems!

# Where does the beef go?

## Australian Consumption

Estimated at 24% higher on average than the maximum suggested by the Australian Dietary Guidelines in 2018[37]

Has increased since then[38,39]

*Alert – when fact checking these statistics please interrogate whether your sources are reliable!*

## Exports

75% of beef produced in Australia is exported[40,41]

Substantial proportion of dietary risks and diet-related mortality worldwide is attributable to international food trade including eating too few fruits, vegetables, legumes and nuts and too much red meat including beef[42]

## Waste

52.4 million tonnes of edible, bone-free beef is discarded each year - about 17% of all global meat production[43,44]

# Nutrition – Beef

**Positives**

Highly bioavailable vitamins and minerals, particularly iron and vitamin B12, and other essential compounds[45].

**Negatives**

Excess consumption (over 455 grams of beef a week) contributes substantially to burden of diseases[46,47] including

- Cancer
- Cardiovascular disease
- Type 2 diabetes.

# Can people eat buffel grass?

Some internet sites claim that buffel grass seeds are sometimes harvested in order to make bread or to be eaten raw by humans (in times of famine) in Northern India, but no reliable support for these claims could be found[48 49 50 51]

# Food Security

Food security exists “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”

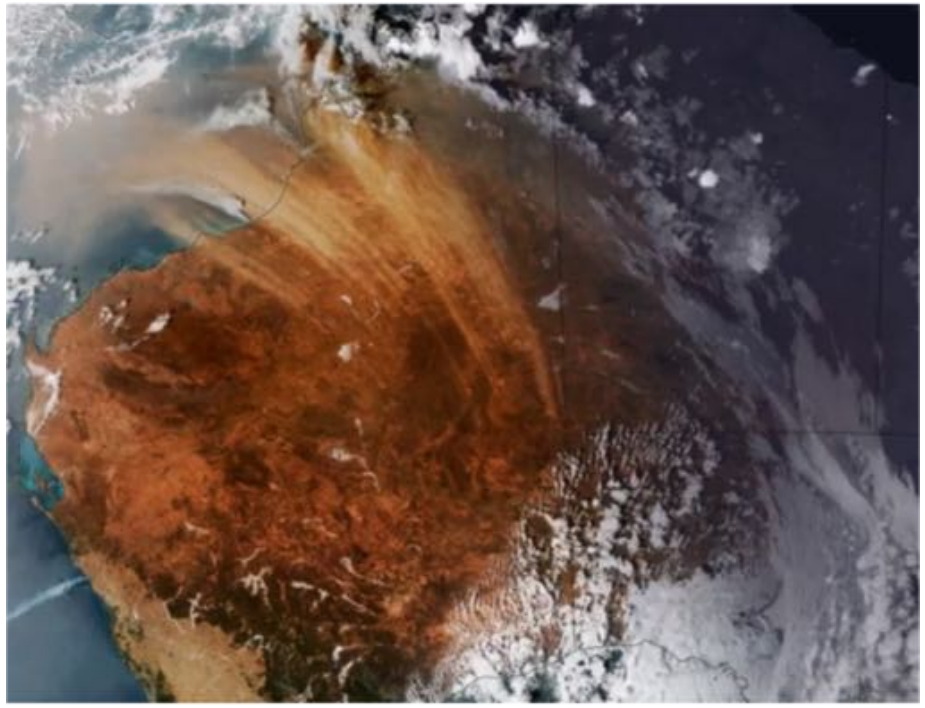
*UN Food and Agriculture Organisation*[52]

# Food Security

Reduction in food supply is by far the most frequently reported impact of invasive species globally (more than 66%)[53].

Industrial food systems[54,55]:

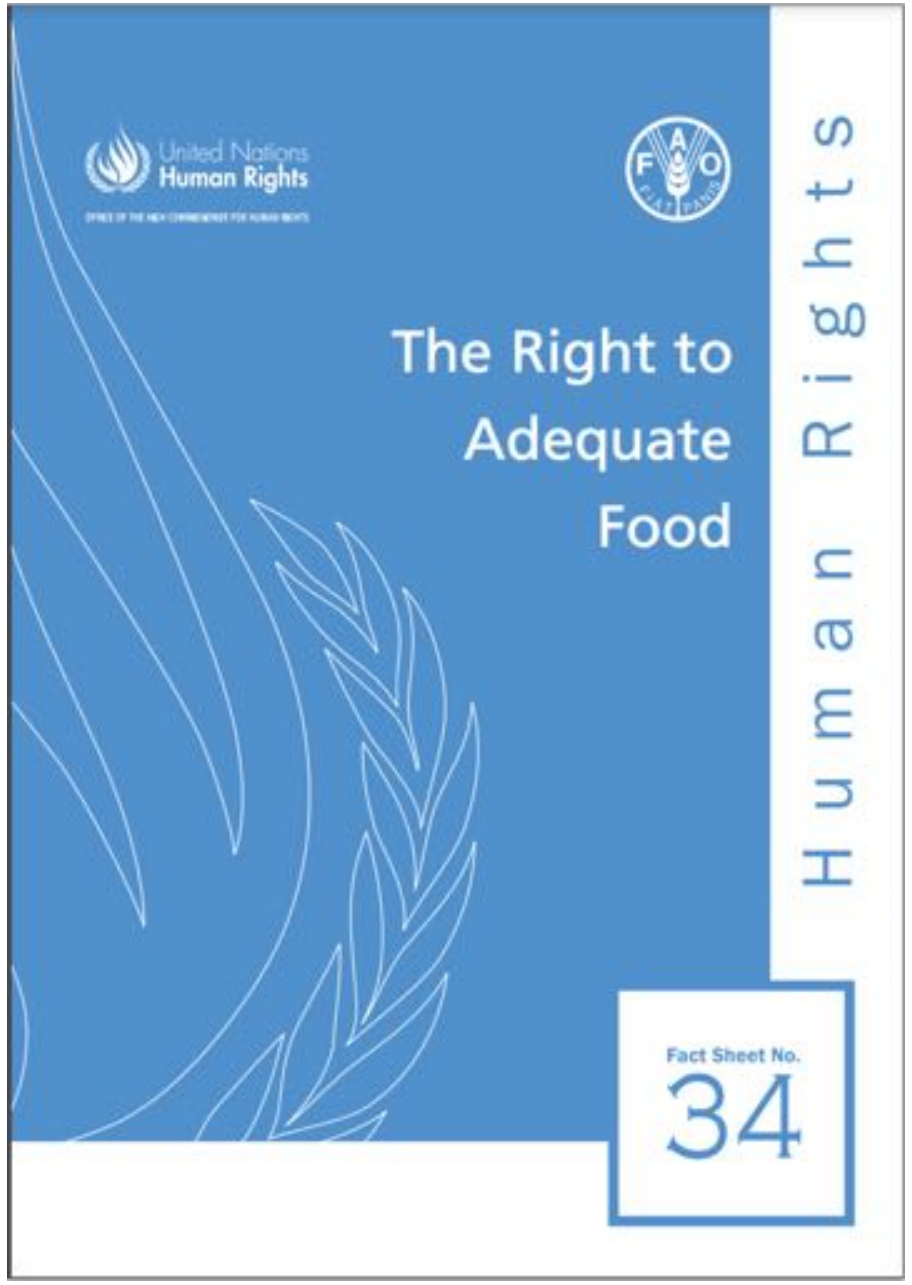
- Are leading contributors to the increasing health and environmental burdens experienced by human populations worldwide
- Threaten climate stability and ecosystem resilience and constitutes the single largest driver of environmental degradation and transgression of planetary boundaries



The UN Human Rights Office states:

*"Indigenous peoples are among the most vulnerable to hunger and malnutrition.*

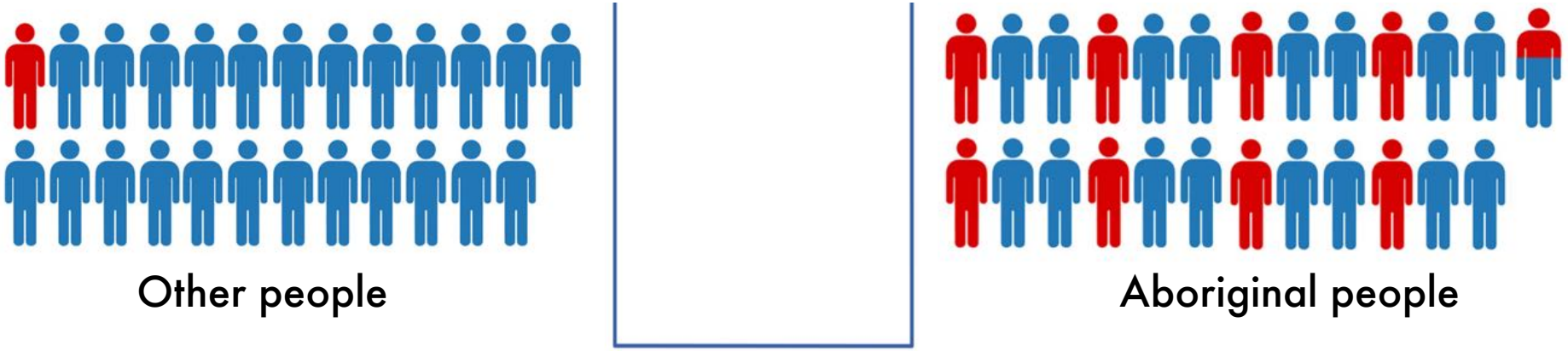
*Hunger and malnutrition among them are largely the result of a long history of social, political and economic exclusion, including centuries of expropriation and* ***despoliation of their lands.***"[56]



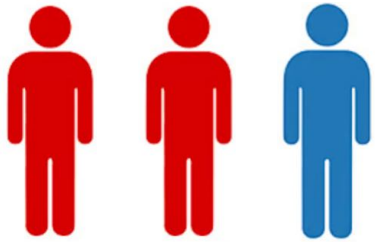
# Food Insecurity in the Northern Territory[57]

- Affects Aboriginal peoples as much as 12 times more than other people
- Rates are worse in remote areas

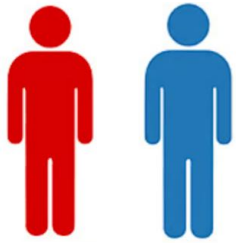
**Households that have run out of food in the previous 12 months**



# Traditional Food Consumption in the Northern Territory[58]



Two in three people report being food insecure

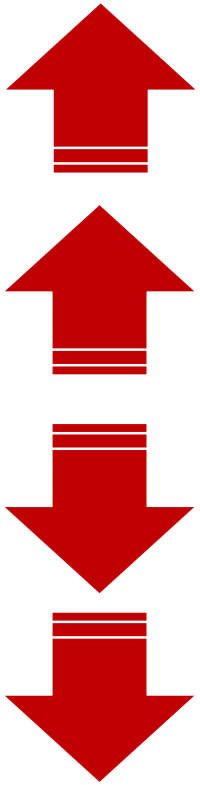


Almost half of these people eat traditional food during these times

Buffel grass invasion negatively impacts, and at times erases, opportunities to obtain traditional foods.

# Nutrition in Australia

Australians of all ages generally have diets that are too[59,60]:



**high in energy density**

**high sugar, saturated fat, and sodium**

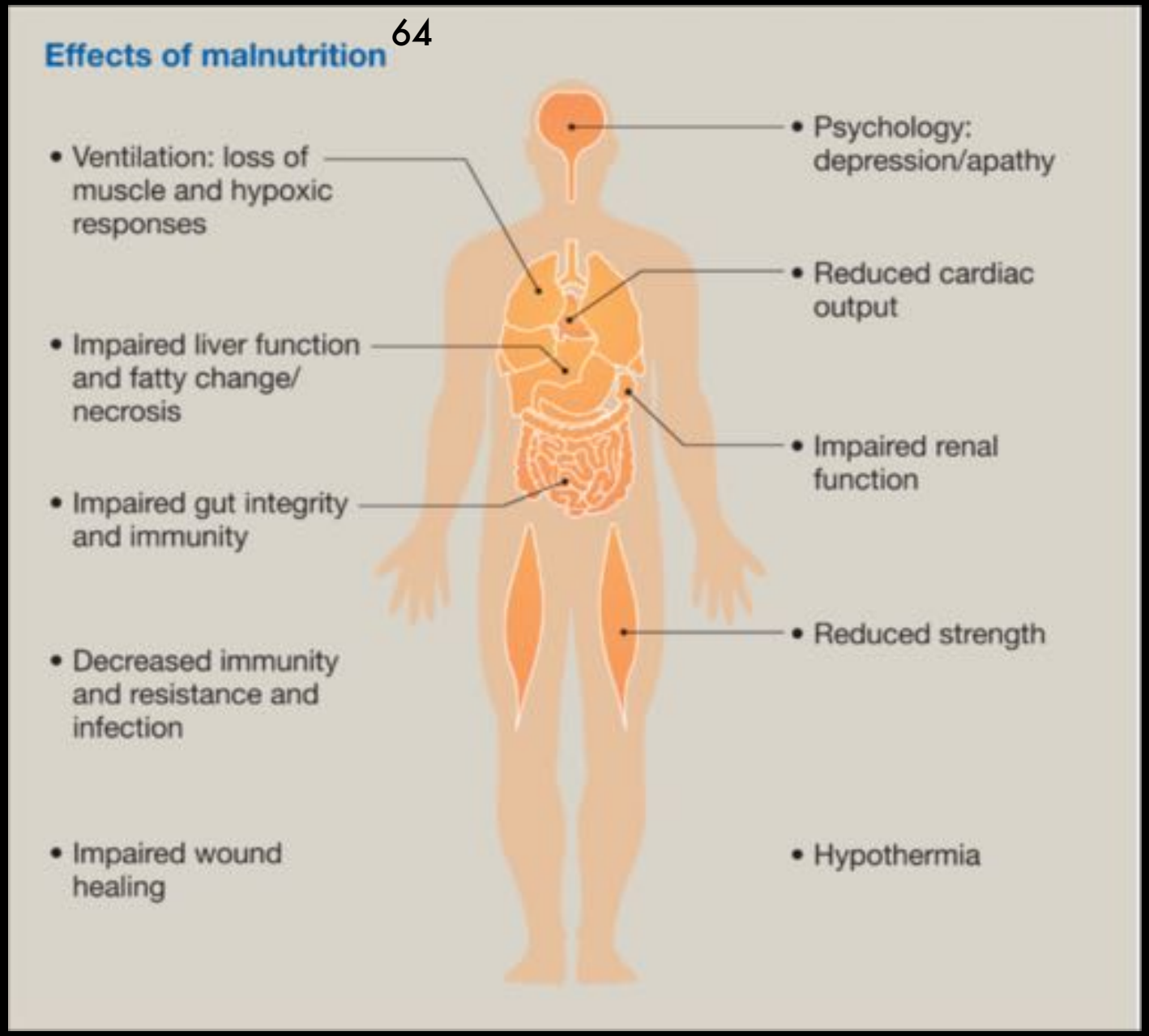
**low in nutrients**

**low in vegetables or fruit**

The consumption of red meat by Australians:

Was estimated at 24% higher on average than the maximum suggested by the Australian Dietary Guidelines in 2018 and has increased since[61,62,63]

# Health Impacts of Poor Nutrition



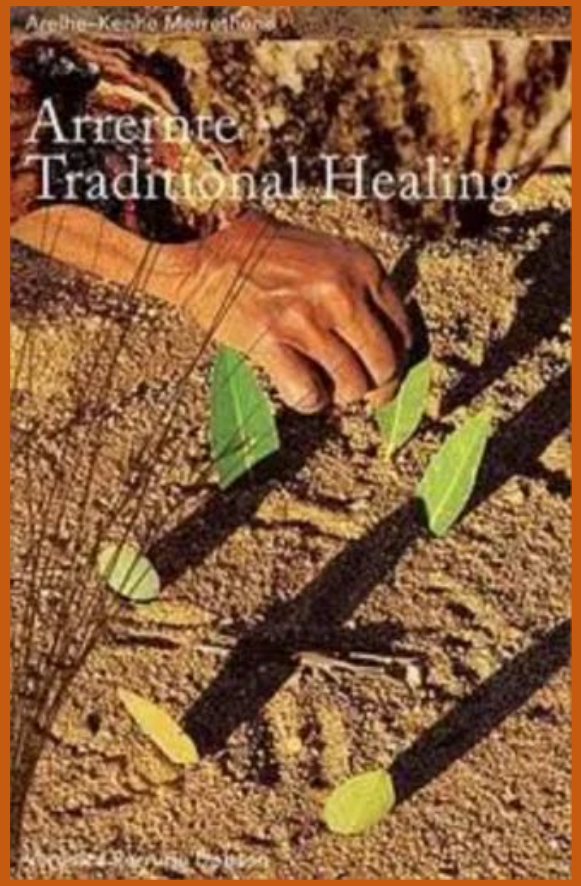

## Associated Chronic Diseases[65]

- Cardiovascular disease
- Type 2 diabetes
- Renal disease
- Some cancers
- Infections

A recent report by the Australian Institute of Health and Welfare concluded that

*"colonisation has led to a loss of traditional food sources and dependence on highly processed European food, which contributes to a higher predisposition to chronic illness"*[66]

In her book *Arelhe-Kenhe Merrethene : Arrernte traditional healing*[67] Senior Eastern Arrernte Woman Veronica Perrurle Dobson speaks of the health impacts of changes in diet:




*"Now there's lots of other, new illnesses that make people from this country sick. The food that is eaten is fatty...Nowadays there are lots of sweet things that our elders never ate or drank. Our elders never got these sicknesses – blood pressure, or no kidney problems, no lung or liver problems, or overweight problems. They didn't know about these, didn't know about these sicknesses. The younger generation is always with these types of sicknesses."*

# Mental Health

The *Australian Institute of Health and Welfare (AIHW) 'Food Security and Indigenous Mental Health'* report found evidence that food insecurity is linked with depression, with suicidal behaviour and *suggests it is the largest contributor to psychological distress*[68].

# Mental Health

This painting is hung at the entrance of the Alice Springs Hospital Mental Health Inpatient Unit.

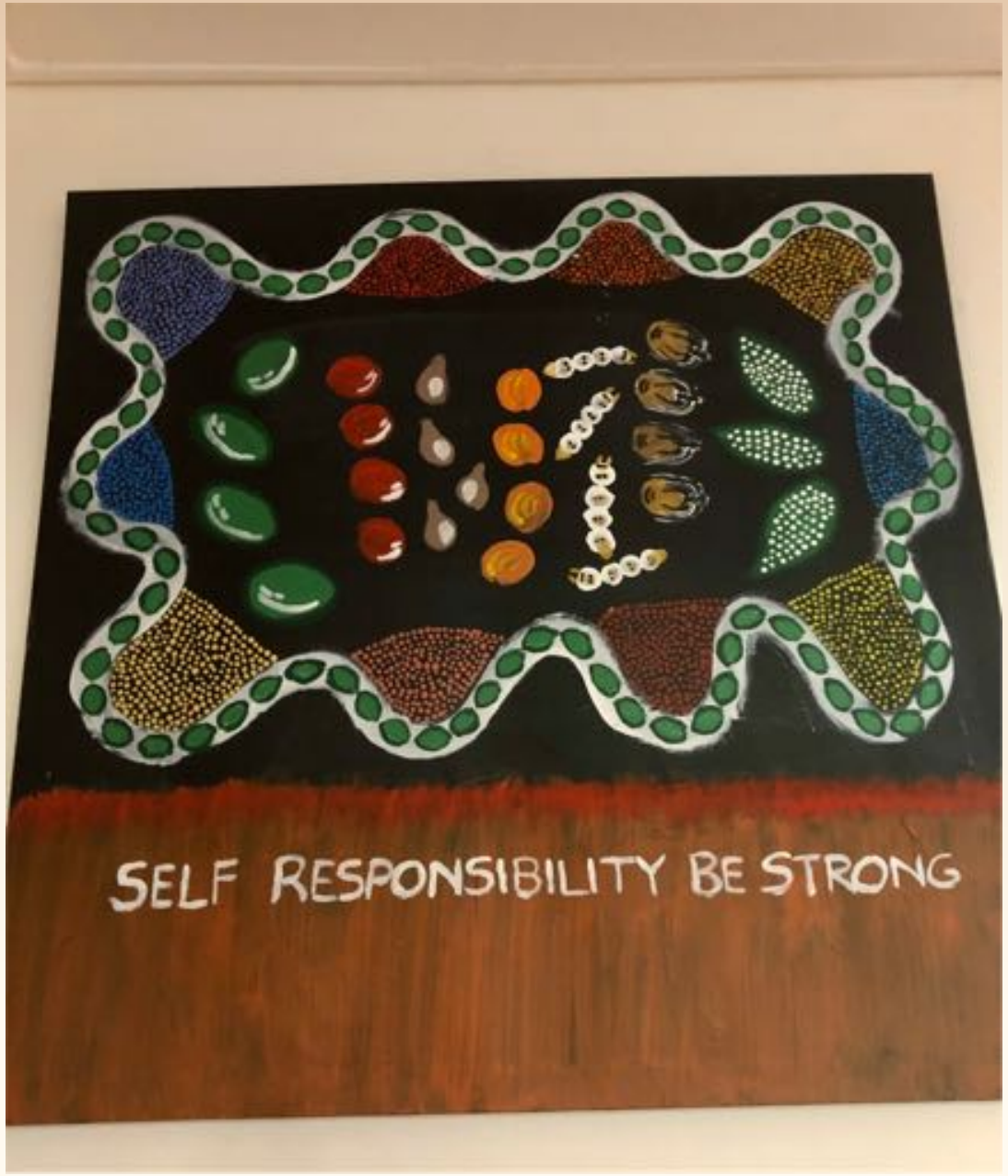
It depicts local foods.

It recognizes of the essential connection between food and mental health.

But…

When access to the foods depicted is being intentionally destroyed for colonisation and industrial agriculture

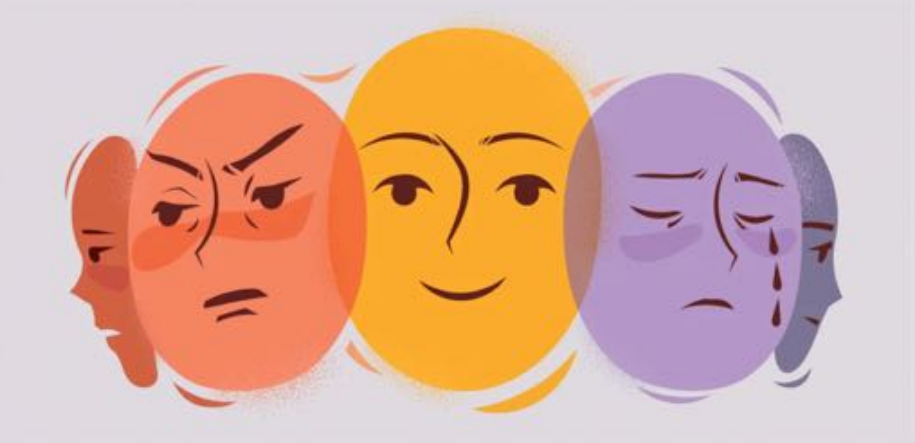
- Who is responsible?
- What does it mean to be strong?



# Social And Emotional Wellbeing[69]

The need to obtain food can compromise cultural safety and induce feelings of shame.

Children in food-insecure households are likely to have emotional or behavioural difficulties and are more likely to miss days of school.



# Culture

In 2014 the International Congress on Nutrition declared[70]:

*"Food is the expression of values, cultures, social relations and people's self-determination, and the act of feeding oneself and others embodies our sovereignty, ownership and empowerment.*

*When nourishing oneself and eating with one's family, friends and community, we reaffirm our cultural identities, our ownership over our life course and our human dignity".*

# Food Knowledge

Food, food knowledge and culture are closely linked with empowerment, self-determination and healthy eating[71,72].

Buffel grass invasion threatens, opportunities to pass on food knowledge and culture[73,74].

# Economic Impact

Diet related illness cost Australia approximately

$1.2 billion per year in 2018-19[75]

# Socio-Economic Impacts

A study on key environmental and socio-cultural threats in central Australia[76] found buffel grass invasion has:

- massive socio-economic impacts stemming from permanent and irreversible disappearance of bush food for at least a decade.
- major socio-economic impacts stemming from local disappearance of hunting from all or part of the affected area (though change likely reversible within a decade if buffel grass is controlled).

# Impacts on Occupation and Employment

Food production has historically been a rich source of occupation and employment across communities.

The central Australian agricultural sector currently employs only 383 people[77].

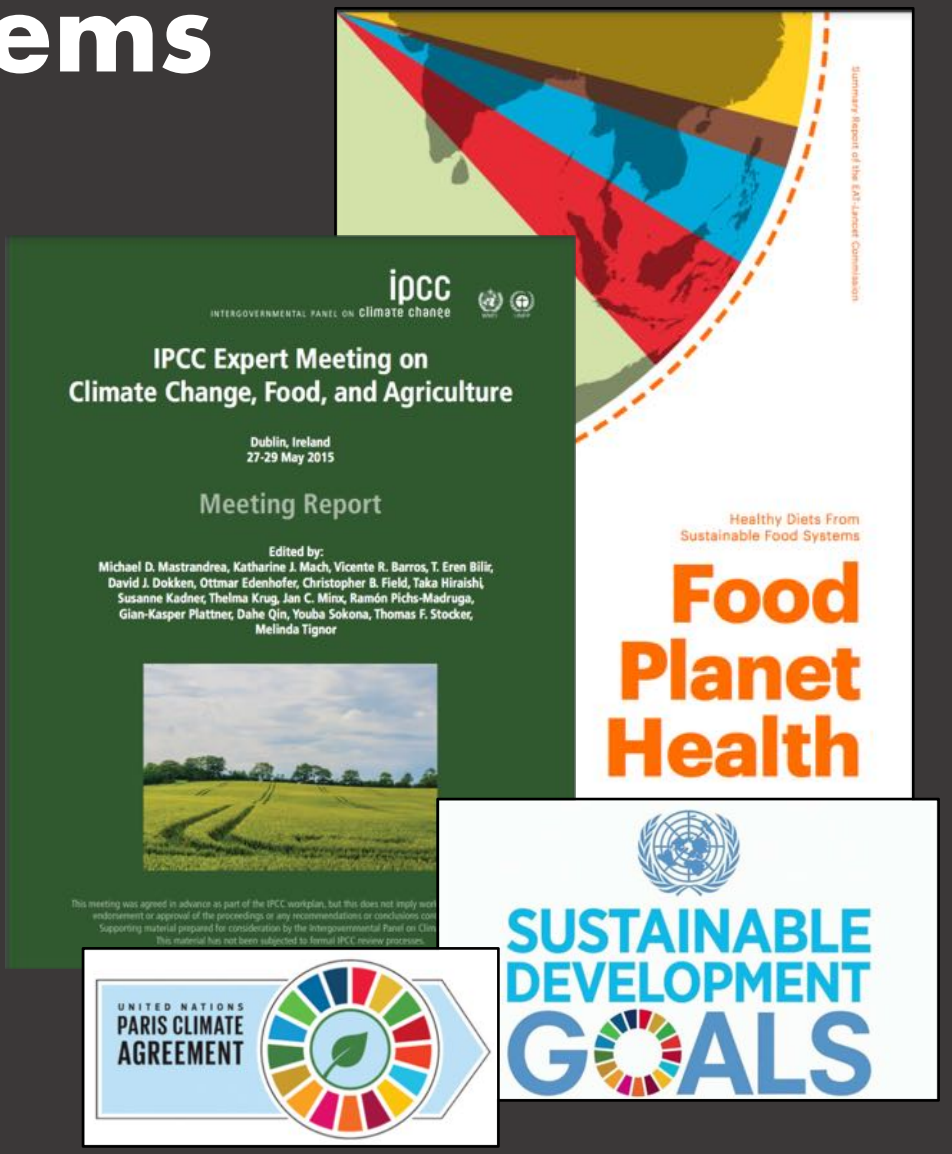
Australian native food sources provides great potential for sustainable, secure food production, occupation and employment[78 79].

These opportunities are undermined by buffel grass invasion.

# Key actions towards achieving healthy and sustainable food systems

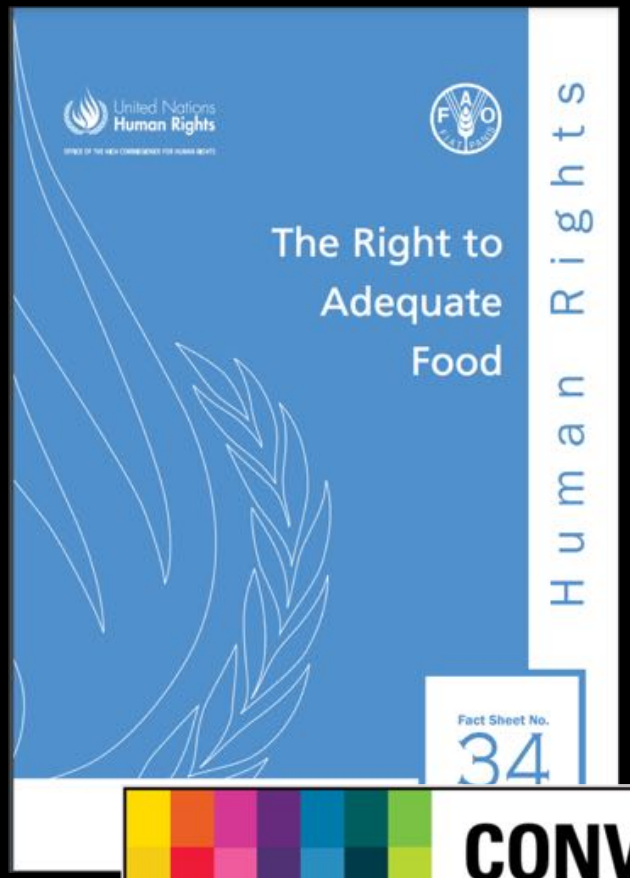
1. A greater than 50% reduction in meat production and consumption
2. A 100% increase in consumption of fruits, vegetables, nuts and legumes
3. **<u>Access to local, diverse food sources</u>**

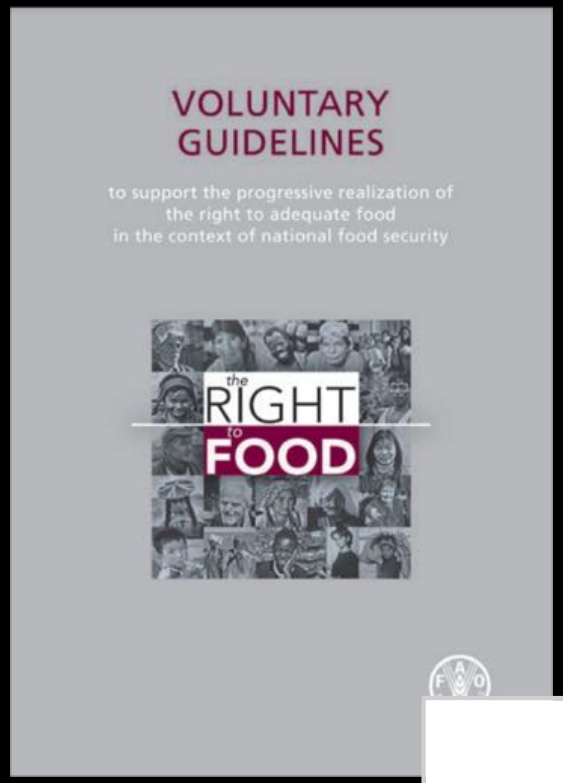
*Without these actions much of the population will increasingly suffer from malnutrition and preventable disease*[79,80]

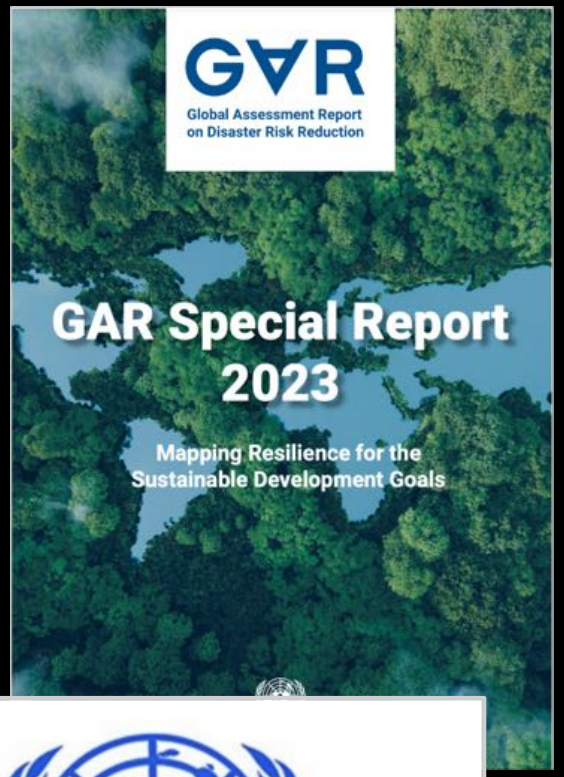


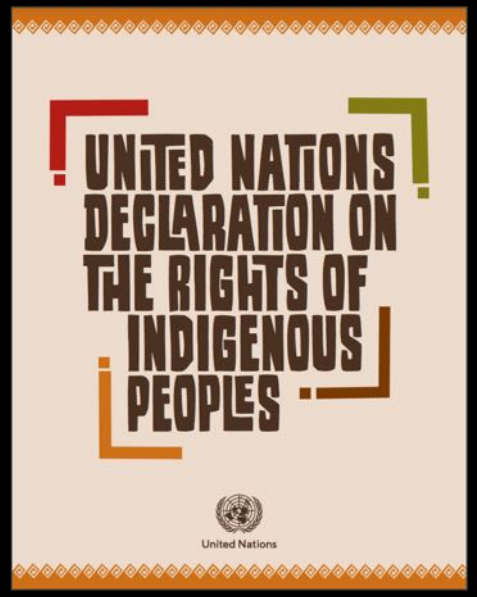
Policy Guidance

# International [81-87]

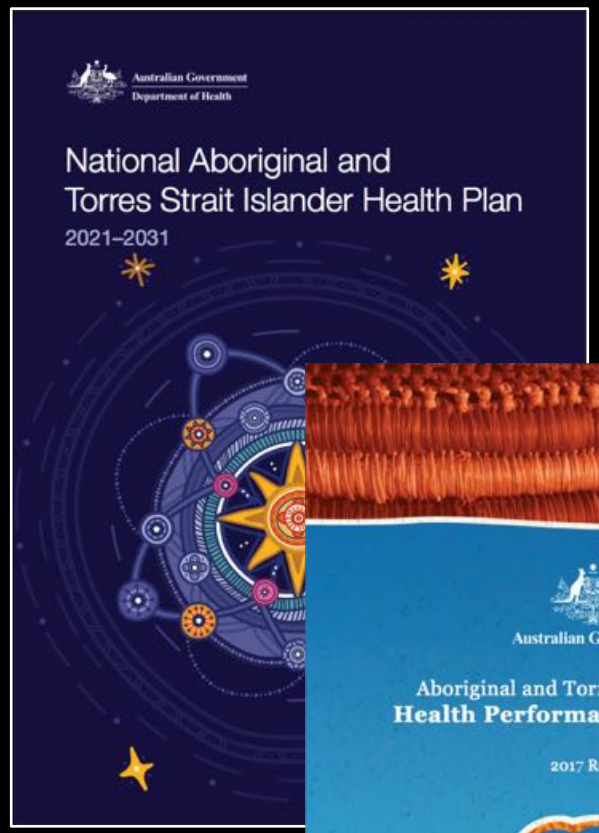


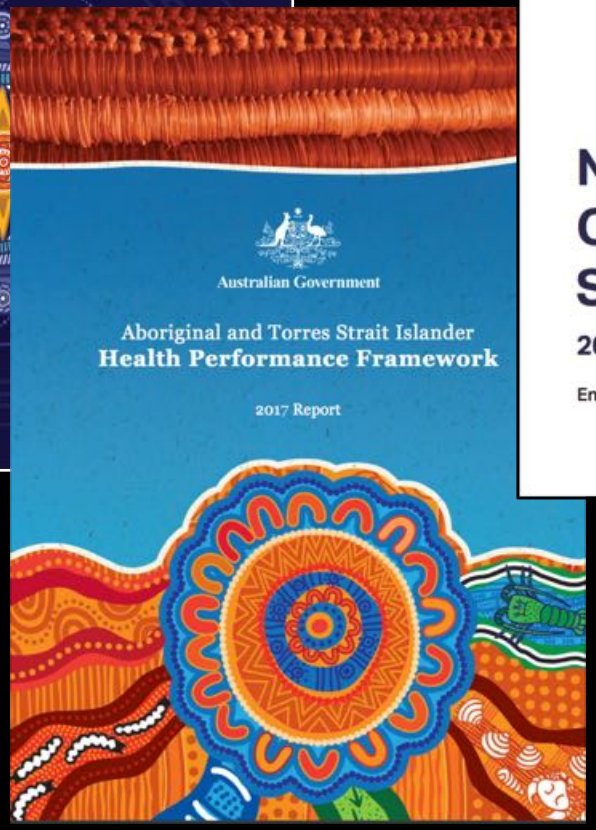



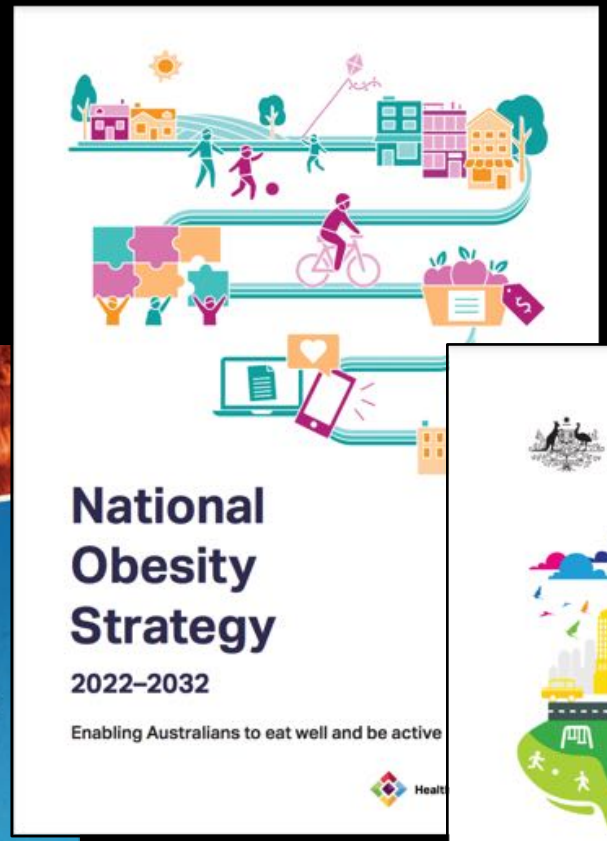



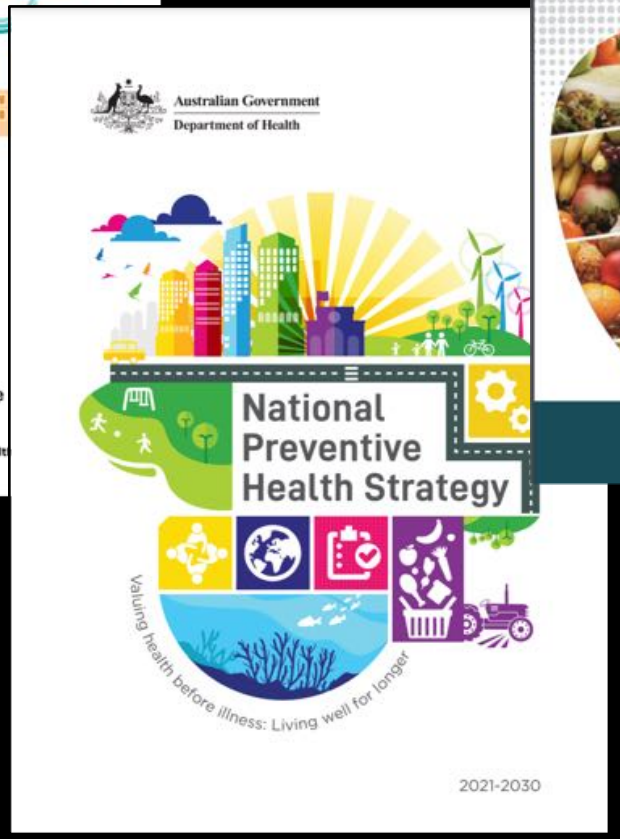



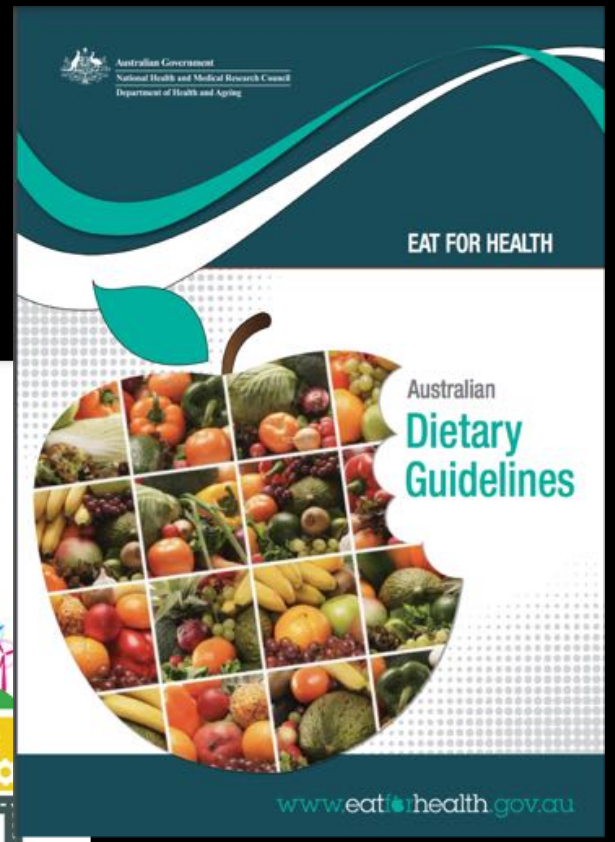
# National [88-92]



# Territory

FOOD
SUMMIT
REPORT
FOOD SECURITY IN THE
NORTHERN TERRITORY
2021
FOR A GOOD LIFE

# Managing Risk

Healthy Country = Healthy People

Functioning natural ecosystems, with a diversity of native plants and animals provide critical defense against many health risks[94,95,96].

# Managing Risk – Biosecurity

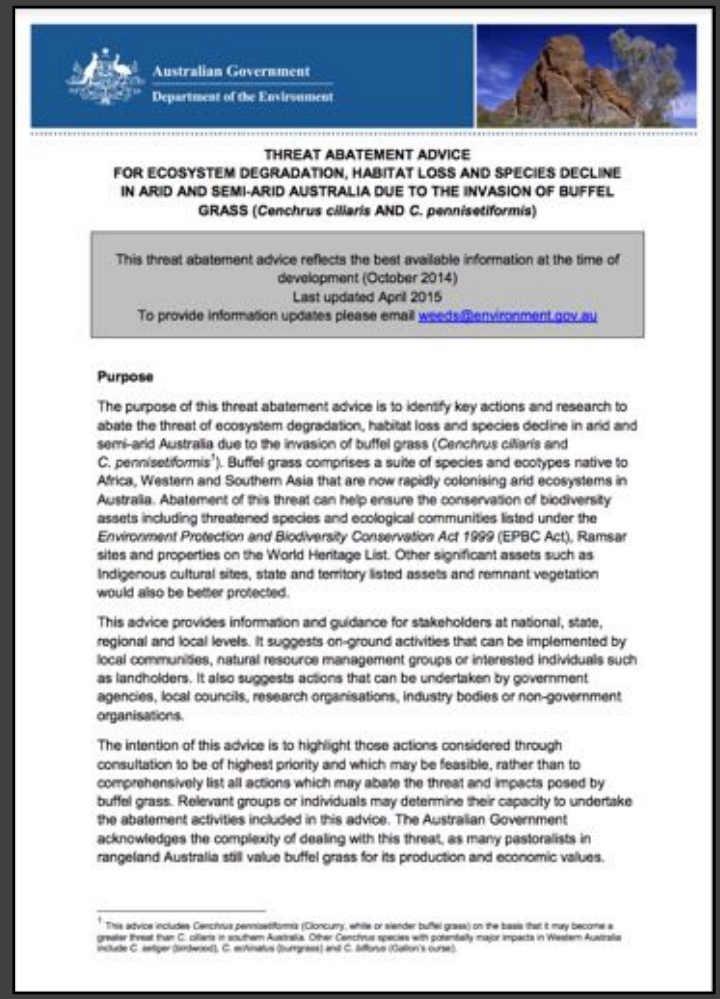
97-100

# What Can Be Done To Mitigate The Threat Posed By Buffel Grass Invasion? [101]

Issued by Australia's *Threatened Species Scientific Committee*

Comprehensive advice and actions that can mitigate the threat posed by buffel grass invasion.

*Following this advice is important for protecting the health of people living in Australia.*



Australian Government
Department of the Environment

**THREAT ABATEMENT ADVICE FOR ECOSYSTEM DEGRADATION, HABITAT LOSS AND SPECIES DECLINE IN ARID AND SEMI-ARID AUSTRALIA DUE TO THE INVASION OF BUFFEL GRASS (*Cenchrus ciliaris* AND *C. pennisetiformis*)**

This threat abatement advice reflects the best available information at the time of development (October 2014)
Last updated April 2015
To provide information updates please email weeds@environment.gov.au

**Purpose**

The purpose of this threat abatement advice is to identify key actions and research to abate the threat of ecosystem degradation, habitat loss and species decline in arid and semi-arid Australia due to the invasion of buffel grass (*Cenchrus ciliaris* and *C. pennisetiformis*[1]). Buffel grass comprises a suite of species and ecotypes native to Africa, Western and Southern Asia that are now rapidly colonising arid ecosystems in Australia. Abatement of this threat can help ensure the conservation of biodiversity assets including threatened species and ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Ramsar sites and properties on the World Heritage List. Other significant assets such as Indigenous cultural sites, state and territory listed assets and remnant vegetation would also be better protected.

This advice provides information and guidance for stakeholders at national, state, regional and local levels. It suggests on-ground activities that can be implemented by local communities, natural resource management groups or interested individuals such as landholders. It also suggests actions that can be undertaken by government agencies, local councils, research organisations, industry bodies or non-government organisations.

The intention of this advice is to highlight those actions considered through consultation to be of highest priority and which may be feasible, rather than to comprehensively list all actions which may abate the threat and impacts posed by buffel grass. Relevant groups or individuals may determine their capacity to undertake the abatement activities included in this advice. The Australian Government acknowledges the complexity of dealing with this threat, as many pastoralists in rangeland Australia still value buffel grass for its production and economic values.

[1] This advice includes *Cenchrus pennisetiformis* (Cloncurry, white or slender buffel grass) on the basis that it may become a greater threat than *C. ciliaris* in southern Australia. Other *Cenchrus* species with potentially major impacts in Western Australia include *C. setiger* (birdwood), *C. echinatus* (burrgrass) and *C. biflorus* (Gallon's curse).

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