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Secretariat of the Pacific Regional Environment Programme

PacWastePlus
PACIFIC WASTE MANAGEMENT

This initiative is supported by **PacWastePlus**-a 72 month project funded by the European Union (**EU**) and implemented by the Secretariat of the Pacific Regional Environment Programme (**SPREP**) **to sustainably and cost effectively improve regional management of waste and pollution.**

Volume 4: Guidance for Decision Makers

ASSESSMENT OF ALTERNATIVES TO SINGLE-USE DISPOSABLE DIAPERS

April 2022

Reducing Environmental Effects while Considering Social and Economic Factors

Research report to assist decision making - analysis of current single-use disposable diaper practices in the Pacific, and a review of viable alternatives.

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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

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PacWastePlus Programme

The Pacific – European Union (EU) Waste Management Programme, PacWastePlus, is a 72-month programme funded by the EU and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) to improve regional management of waste and pollution sustainably and cost-effectively.

About PacWastePlus

The impact of waste and pollution is taking its toll on the health of communities, degrading natural ecosystems, threatening food security, impeding resilience to climate change, and adversely impacting social and economic development of countries in the region. The PacWastePlus programme will generate improved economic, social, health, and environmental benefits by enhancing existing activities and building capacity and sustainability into waste management practices for all participating countries.

Countries participating in the PacWastePlus programme are: *Cook Islands, Democratic Republic of Timor-Leste, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu*.

KEY OBJECTIVES

Outcomes & Key Result Areas

The overall objective of PacWastePlus is "to generate improved economic, social, health and environmental benefits arising from stronger regional economic integration and the sustainable management of natural resources and the environment".

The specific objective is "to ensure the safe and sustainable management of waste with due regard for the conservation of biodiversity, health and wellbeing of Pacific Island communities and climate change mitigation and adaptation requirements".

Key Result Areas

- Improved data collection, information sharing, and education awareness
- Policy & Regulation - Policies and regulatory frameworks developed and implemented.
- Best Practices - Enhanced private sector engagement and infrastructure development implemented
- Human Capacity - Enhanced human capacity

Learn more about the PacWastePlus programme by visiting

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PacWastePlus PACIFIC WASTE MANAGEMENT

https://pacwasteplus.org/

About this Research Publication Series

Single-use disposable diapers have been identified as a waste issue in Pacific countries, both in landfills and as a commonly littered item. Three Pacific countries (Kiribati, Vanuatu and Tuvalu) have implemented import controls to assist with the management of single-use disposable diapers, the only known measures of their kind in the world. However, the need to contain and manage baby excreta to reduce public health risks is well understood, as is the need for economic growth and equality and inclusion in today's Pacific societies, ensuing women are encouraged into the workforce and to contribute to community activities.

The Pacific therefore faces a challenge: attempting to reduce environmental risks from the disposal of single-use disposable diapers, while balancing the social and economic benefits that single-use disposable diapers bring. Currently there is a lack of reliable information on suitable alternatives for single-use disposable diapers to enable informed decisions in the Pacific Island context.

This research, commissioned by the Secretariat of the Pacific Regional Environment Programme (SPREP) through the European Union's funded PacWastePlus Programme, aimed to fill this gap by providing information to:

- Guide informed decision making for governments when developing policy controls to reduce environmental effects from single-use disposable diapers, while balancing social and economic factors
- Inform communities and the private sector on viable alternatives to current single-use disposable diaper use and disposal practices for the Pacific.

Assessment of Alternatives to Single-use Disposable Diapers Publication Series

Volume 1:
Executive Summary

Summary of the research background and key findings

Volume 2:
Literature Review

Research report that provides details on the background of single-use disposable diapers and alternative infant hygiene garments and review of global policies addressing single-use disposable diapers management

Volume 3:
Field Work and Results

Details of the research methodology and findings for each research component

Volume 4:
Guidance for Decision Markers

Guidance for informed decision making for governments when developing policy controls to reduce environmental effects from single-use disposable diapers, while balancing social and economic factors

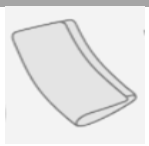
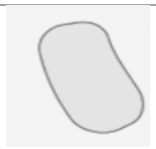
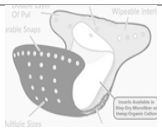
Volume 5:
Guidance for Communities and Private Sector

Informs communities and the private sector on viable alternatives to current single-use disposable diaper use and disposal practices

Glossary

Item	Description
Engineers Without Borders	For-purpose organisation creating social value through engineering. Completed social and technical components of this research.
Escherichia coli (E. coli)	Bacteria found in the environment, foods, and human excreta. E. coli can make humans sick with diarrhoea and other illnesses.
Excreta	Waste matter (such as urine and faeces) eliminated from the body
Infant hygiene garments	Covering used to contain baby excreta including single-use disposable diapers and reusable nappies
Pit latrine or ventilated pit (bush toilet / long drop	Type of toilet that collects human excreta in a hole in the ground
Reusable nappy	A cloth garment, traditionally square and made from towelling, but more recently including modern cloth nappies. They are reusable and require laundering. The local vernacular differs in describing these types of products. For example, in Vanuatu and Samoa, the word 'napkin' is used for this type of nappy, and in Tonga 'napikeni' is used. Components of reusable nappies are provided in the following illustration.
Rural	Small villages with a low population, outside cities or towns
Secretariat of the Pacific Regional Environment Programme (SPREP	Inter-governmental organisation established by the Governments and Administrations of the Pacific charged with protecting and managing the environment. Commissioned this research.
Single-use biodegradable, eco/environmentally friendly**, compostable diaper (eco-friendly / compostable single-use diaper**	A single-use garment that has waterproof qualities similar to those in single-use disposable diapers, but that claim biodegradability, environmentally friendliness, or compostability. These diapers are commonly made from cellulose, chlorine-free wood pulp, super absorbent polymer (SAP), cotton, bamboo, and other plant-based fibres. Most versions use non-compostable (petrochemical-based) plastics for fasteners.
Single-use disposable diaper	A single use, throw away garment that is waterproof, and fitted. Single-use disposable diapers are available to be used from birth until babies are potty trained. Single-use disposable diapers are manufactured with a range of petrochemical-based plastics, and a complex combination of polymer types.
Super Absorbent Polymer (SAP) (also known as slush powder)	A water-absorbing polymer that can absorb and retain extremely substantial amounts of a liquid. Primarily used as an absorbent solution for diapers. Main ingredients are acrylic acid, and sodium hydroxide.
Urban	Densely populated area, usually a city or town, usually provided with government services such as water and wastewater
Wastewater soak-away area	Typically, a pit, filled with natural liner/filtration such as gravel or aggregates, into which wastewater is piped so it can drain slowly out into the surrounding soil

Components of Reusable Nappies'

Components	Illustration	Description
Prefolds		Flat square of fabric with thicker middle panel sewn in, eliminating some folding
Fitteds		Fabric diapers that have sewn-in elastic and often fasteners such as snaps or velcro
Covers		Water resistant material that is used over an absorbent piece such as prefold, fitted, or insert.
Inserts and Boosters		Absorbent layer you add to your nappy to absorb fluids
Pockets		Diapers with a waterproof cover already sewn to the outside, a fabric inside layer, and an opening for stuffing inserts.
All-in-One		Diapers sewn all together with inserts, waterproof cover, and fasteners all in one piece.
All-in-Two		Waterproof outer covers that feature either lay-in or snap-in inserts.
Liner		Thin top layer helps catch solids and reduce soiling. Usually designed to draw moisture. Can be disposable or reusable.
Modern Cloth Reusable Nappy (Modern Cloth Nappy)		Fitted premade reusable nappy design similar to single-use disposable diapers but able to be washed and reused

Introduction

The transition to a more convenient lifestyle over the last seventy years has seen a dramatic increase in single-use plastic items onto global markets (UNEP, 2018). Included in the range of items are single-use disposable diapers. Although convenient in their use, the post-use disposal of these items is increasing solid waste that is difficult to manage and has significant impacts on our environment (UNEP, 2021).

Single-use disposable diapers have been identified as a waste issue in Pacific countries, both in landfills and as a commonly littered item. Three Pacific countries (Kiribati, Vanuatu, and Tuvalu) have implemented import controls to assist with the management of single-use disposable diapers, the only known measures of their kind in the world. However, the need to contain and manage baby excreta to reduce public health risks is well understood, as is the need for economic growth and equality and inclusion in today's Pacific societies, ensuing women are encouraged into the workforce and to contribute to community activities.

Currently there is a lack of reliable information on suitable alternatives for single-use disposable diapers to enable informed decisions in the Pacific Island context. This research, commissioned by SPREP through the European Union's funded PacWastePlus Programme, aims to fill this gap by providing information to:

- Guide informed decision making for governments when developing policy controls to reduce environmental effects from single-use disposable diapers, while balancing social and economic factors
- Inform communities and the private sector on viable alternatives to current single-use disposable diaper use and disposal practices for the Pacific.

This research sought to:

- Explore current **practises** on the use and disposal of single-use disposable diapers, reusable nappies, and eco-friendly / compostable diapers in the Pacific
- Explore current **perceptions** on the use and disposal of single-use disposable diapers, reusable nappies, and eco-friendly / compostable diapers in the Pacific
- Explore the **physical performance** of reusable nappies and eco-friendly / compostable diapers in the Pacific
- Identify and understand **barriers and opportunities** for reducing environmental impacts associated with single-use disposable diaper disposal in Pacific communities, balancing social and economic factors

Guidance for Pacific Decision Makers

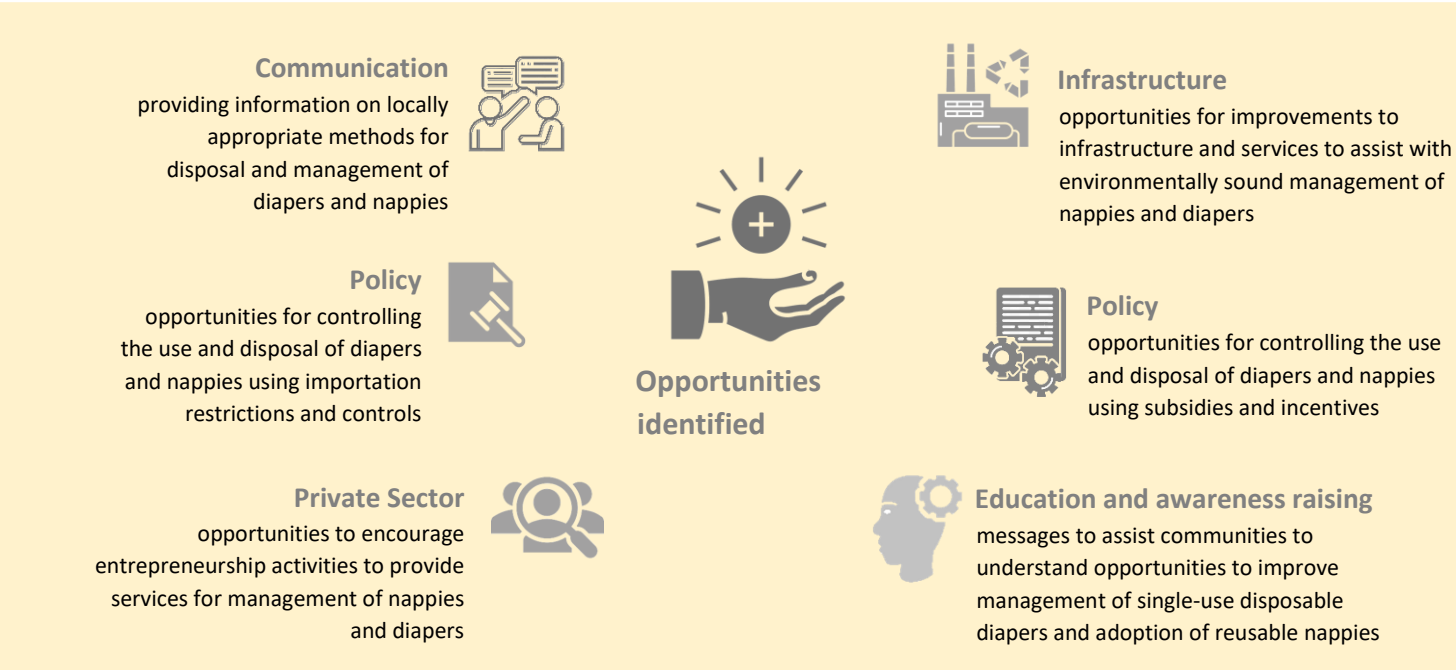
Pacific countries are seeking to manage the growing environmental concerns of single-use disposable diapers, with three countries currently implementing new policy measures:

- **Vanuatu** - the first country to introduce their "intent" to ban single-use disposable diapers from import
- **Kiribati** - introduced legislation to prohibit the importation of 'non-biodegradable nappies'
- **Tuvalu** – a levy of AUD0.05c (USD0.03c) has been added to each single-use disposable diaper imported

Prior to developing and implementing policy measures such as these, Pacific decision makers are recommended to make evidence-based decisions considering social, economic, infrastructure, and environmental factors, including:

- what are the viable alternatives to single-use disposable diapers?
- how much will alternatives cost to communities (considering upfront cost, and costs for households if woman are restricted from returning to the workforce)?
- what associated infrastructure is needed?

If policy to manage disposable diapers is implemented without considering factors such as these, it may result in hardship on vulnerable sectors of the community. Findings from this research are summarised for decision makers - to provide evidence-based information and a summary of opportunities to consider when developing new policy for the management of single-use disposable diapers and adoption of reusable nappies. There is no 'one size fits all' fix when considering new policy for managing items such as disposable diapers so decision makers are recommended to consider opportunities and design solutions appropriate for their communities in consolation with stakeholders (including parents, church and community groups, village Chiefs, local businesses, healthcare professionals, educators, waste managers, etc).



Communication - Locally Appropriate Disposal and Management

Prior to implementing any policy or investment into management of nappies and diapers, it is recommended decision makers understand what the recommended management practises are and communicate that information to enable locally appropriate disposal methods or protocols to their communities and community leaders to implement.

Not all Pacific communities have same access to water and waste collection facilities and therefore the recommended management and disposal of diapers and nappies may vary. The following illustrations provides information on "do's" for communities, depending on community facilities, and information on "do not's".

It is recommended decision makers supply this information to their communities and community leaders to raise awareness on locally appropriate methods for disposal and management of diapers and nappies.

***Note**: The following illustrations presents the recommended **environmental** options for use and disposal of diapers and nappies and does not factor in social or economic costs and benefits. Communication with communities is recommended prior to implementing any policy, protocol, or "community rule".*

Communities WITH Waste Collection

Communities WITH REGULAR WATER

1 Use reusable nappies whenever possible

Recommended practice:

- Empty baby excreta into toilet or ventilated improved pit toilets (*or other*)
- Wash reusable nappies in a bucket
- Take care to empty wastewater away from children, pets, water supplies and gardens, in either a flush toilet or in a dedicated soak-away where dry toilets are used
- Dry reusable nappies in the sun to use UV to disinfect any E.coli

Option: Construct community designated soak-away area – away from groundwater, water supplies and gardens

2 If single-use disposable diapers are used

Recommended practice:

- Empty baby excreta into toilet or ventilated improved pit toilets (*or other*)
- Put out for collection (*taking care to keep away from dogs and other wildlife*)

Recommendation: Construct community dog-proof waste collection platforms / cages

Communities **WITHOUT** REGULAR WATER

1 Use single-use disposable diapers

Recommended practice:

- Empty baby excreta into toilet or ventilated improved pit toilets (*or other*)
- Put out for collection (*taking care to keep away from dogs and other wildlife*)

Recommendation: Construct community dog-proof waste collection platforms / cages

Alternative
Use reusable nappies

Recommended practice:

- Empty baby excreta into toilet or ventilated improved pit toilets (or other)
- Use seawater or rainwater water in a bucket to wash nappy (*if using seawater, try to rinse with rainwater after cleaning, and use rainwater every so often (when possible) to remove the hardness of the nappy*)
- Take care to empty wastewater away from children, pets, and water supplies into a soak-away where dry toilets are used
- Dry reusable nappies in the sun to use UV to disinfect any E. coli

Option: Construct community designated soak-away area for nappy wastewater – away from groundwater, water supplies and gardens

Communities **WITHOUT** Waste Collection

Communities **WITH OR WITHOUT** REGULAR WATER

Use reusable nappies whenever possible

Recommended practice:

- Empty baby excreta into toilet or ventilated improved pit toilets (or other)
- Use seawater or rainwater water in a bucket to wash nappy (*if using seawater, try to rinse with rainwater after cleaning, and use rainwater every so often (when possible) to remove the hardness of the nappy*)
- Take care to empty wastewater away from children, pets, and water supplies into a soak-away where dry toilets are used
- Dry reusable nappies in the sun to use UV to disinfect any E. coli

Recommendation: Construct community designated soak-away area for nappy wastewater – away from groundwater, water supplies and gardens

Alternative
Single-use disposable diapers

Recommended practice:

- Empty baby excreta into toilet or ventilated improved pit toilets (*or other*)
- Bury used diapers in controlled, covered pits

Recommendation: Construct community designated disposal area – away from groundwater / lined with clay or impervious surface

Infrastructure - Improvements to Infrastructure and Services

Governments seeking to assist communities to reduce environmental impacts from disposal of single-use diapers or improve uptake of reusable nappies, infrastructure and services improvements may need to be considered.

This research identified several infrastructure and services, as summarised in Table 1, which can be provided by local or central government, or self-organised within communities. The following table summarises each opportunity and provides comments on social and economic factors decision makers may consider.

Table 1: Infrastructure Opportunities to Improve Management of Diapers / Nappies

Opportunity	Discussion	Considerations
Improved Management of Single-use Disposable Diapers		
Improvements in rubbish collection coverage to increase access to engineered, managed landfills	Lined, engineered landfills are currently the best environmental option for disposal of single-use disposable diapers: • bacteria and toxins cannot leach into the soil, groundwater, and other water sources • dioxins and toxic fumes from burning will not be released • plastics and chemicals will not enter the environment and oceans By extending collection coverage for these facilities, more communities can benefit from having their waste removed and managed in accredited manner	Increasing collection coverage will have increased costs for government or agency proving the service – potentially requiring additional trucks, labour, fuel, etc Costs may be funded through donor partners or can be shared / passed on to households through a system such as a pre-paid bag Dog proof waste collection bins may be required in certain communities Increased education of best-practice management of single-use disposable diapers (i.e., before disposing diaper, rinse excreta into the toilet to contain possible pathogen transmission) recommended in combination with infrastructure development
Pre-paid bag service	Lined, engineered landfills are currently the best environmental option for disposal of single-use disposable diapers A pre-paid bag system may provide an option for the government or agency proving waste collection services can share / pass the costs associated for extending this collection to the households utilising the service Examples of pre-paid bag systems can be found in the capital islands of Vanuatu and Kiribati	Introduction of any new service is recommended to involve consultation with affected communities Price for pre-paid bag to consider costs of trucks, labour, fuel. Also consider ability / willingness of community to pay Without appropriate consultation and community buy-in, introduction of a paid waste service has potential result in an increase in illegal dumping and burning of waste. Consultation with affected communities recommended. Example of community in Vanuatu establishing their own informal pre-paid bag waste collection is provided in Volume 3.
In areas without access to lined engineered landfills, development of separate lined disposal area for single-use disposable diapers (and separate collection)	In absence of engineered landfills, it may be an option to line an area of municipal or community dumpsites with a low permeable surface such as clay or geotextile fabric and dedicating this area to Disposable Diapers disposal. This lining would assist reduce the leach of bacteria and toxins into soil and water sources.	Lining dumpsites will have a cost for governments or communities (costs may be funded through donor partners) Dumpsite recommended to be located away from community water sources and gardens

Opportunity	Discussion	Considerations
	Dumpsite recommend being located away from community water sources and gardens Collecting disposal single-use disposable diapers in one area would contain potential pollution to one are, reducing risks in remainder of community.	Separated bins/bags and collection of single-use disposable diapers required if disposed at separate area of dumpsite Community communication and consultation recommended to ensure understanding and buy-in for separated collection and disposal Dog proof waste collection bins may be required in certain communities Increased education of best-practice management of baby excreta - i.e., before disposing diaper, rinse excreta into the toilet to contain possible pathogen transmission – recommended in combination with infrastructure development
Construct locally appropriate dog proof bins	Impact of dogs "opening rubbish bags and spreading diaper waste" was a common finding from research. This can cause an environmental and health risk though spreading bacteria and materials around the community. Communities using any type of waste collection service or storing single-use disposable diapers outside are recommended to utilise waste bins or platforms that dogs and other wildlife cannot access.	Constructing dog proof bins / platforms will have a cost for governments or communities (costs may be funded through donor partners) Community communication and consultation recommended for design and location of bins / platforms Increased education of best-practice management of baby excreta - i.e., before disposing diaper, rinse excreta into the toilet to contain possible pathogen transmission – recommended in combination with infrastructure development
Assist with Adoption of Reusable Nappies		
Investment in secure water supply and development of designated area for washing nappies and soak-away wastewater disposal system	61% of households in research share a water source with other household(s) and 77% use a bucket to wash reusable nappies. To reduce and contain any potential spread of E. coli and other virus transmission from shared water sources, it is recommended for communities to establish a dedicated soak-away area with appropriate drainage and filtration for disposal of wastewater Soak-away site recommend being in a well-draining site located away from community water sources and gardens	Constructing soak-away system will have a cost for governments or communities (costs may be funded through donor partners) Community communication and consultation recommended when determining location soak-away area and use protocols Increased education of best-practice management of baby excreta - i.e., safest way to dispose of baby excreta is to rinse excreta into the toilet to contain possible pathogen transmission (combined with increased toilet installations) - could contribute to reduced health risks from E. coli and other virus
Investment in toilet and effective septic tank /sewerage containment for households / communities	The safest way to dispose of baby excreta is to rinse into a toilet to contain possible pathogen transmission In this study, 49% of participants indicated they had a flush toilet in their home; 28% had either pit latrine or Ventilated Pit toilets at home Investment in toilet facilities will allow communities to benefit from having excreta contained and managed safely	Building toilets and effective septic tank /sewerage containment will have a cost for governments or households (costs may be funded through donor partners) Investment in toilet facilities recommend being combined with education on how to manage septic waste (i.e., how to have sewerage removed when tank full) Investment in toilet facilities recommend being combined with education – i.e., safest way to dispose of baby excreta is to rinse excreta into the toilet

Opportunity	Discussion	Considerations
Investment in shared non-electric washing machines (tumble drums) for communities	73% of households use single-use disposable diapers as they are easy and convenient; and being "a lot of work" is the common perceptions against using reusable nappies 77% of households currently using reusable nappies use a bucket to wash them Investment in shared non-electric washing machines (tumble drums) for communities may provide an alternative washing technique reducing some of the burden households may face to adopt reusable nappies Note: in the "washability test", the handwashing technique performed as well or better than the machine-washing techniques against the three indicators, indicating performance is not a concern, just efficiency.	Investment in shared non-electric washing machines recommend being combined with investment in management of septic waste and education on how to use reusable nappies Non-electric washing machines will have a cost for governments or households (costs may be funded through donor partners) Assessment and development of non-electric washing machines is currently being undertaken in Vanuatu

Policy - Importation Restrictions and Controls

As illustrated by Vanuatu, Kiribati, and Tuvalu, several Pacific Island country government's view restrictions, and controls on the importation of single-use disposable diapers to reduce environmental impacts and improve uptake of reusable nappies or eco-friendly / compostable diapers. Introduction of importation policies may be seen as an effective option to create change, however policy changes on their own may not provide an effective long-term solution that is equitable for all communities. Investment in new services and infrastructure (discussed above) may be needed alongside the new policy; as may effective community consultation.

Policies for controlling or restricting importation currently being considered by Pacific countries, or identified in the research, include the following:

- Ban the importation of single-use disposable diapers
- Ban the importation of "non-biodegradable / compostable" single-use disposable diapers
- Implement import and standards and controls to ensure only quality and long-lasting reusable nappies are available
- Implement levy on the importation of single-use disposable diapers

The following table discusses each policy and provides comments on social and economic factors to consider. It is highly recommended new policy should be designed through consolation with stakeholders (including parents, church and community groups, village Chiefs, local businesses, healthcare professionals, educators, waste managers, etc). Policies designed by and with the support of stakeholders have a greater chance at success.

Table 2: Policy Opportunities to Improve Management of Diapers / Nappies

Opportunity	Comments	Considerations
Ban the importation of single-use disposable diapers	Banning the use and import of single-use disposable diapers is seen to manage the environmental effects from incorrect disposal practises Vanuatu is the first country in the world to implement a ban of single-use disposable diapers, under phase II of their *Waste Management Regulations 2018* Implementation of this ban has been delayed due to a change in government and to allow more time to consider and consult further on the implications of the ban due to community dissatisfaction.	Banning single-use disposable diapers may manage environmental effects from their incorrect disposal, however, may result in other environmental effects (associated with limited water and wastewater facilities) and disproportionate social and economic impacts on families (parents may have less opportunity to work) For a ban of single-use disposable diapers to be effective and equitable, it may require accompaniment with significant investment in water and wastewater facilities, incentives and subsidies for reusable and education Introduction of any new policy controls, particularly associated with product bans are recommended to involve effective two-way consultation with affected stakeholders and communities to obtain feedback, community understanding and buy-in.
Ban the importation of "non-biodegradable / compostable"	Limiting the import of disposable diapers to those that are eco-friendly / compostable diapers is seen to reduce their environmental effects	As highlighted in Volume 3, there are no known eco-friendly / compostable diapers on the market able to claim 100% biodegradability or compostability. Eco-friendly / compostable single-use diapers on the market do not reduce volumes in landfills or degrade / compost automatically in the environment.

Opportunity	Comments	Considerations
single-use disposable diapers	Kiribati is the first country in the world to implement such a restriction, through Schedule 3 (Section 64) of their *Customs Act 2007* Implementation of the ban in Kiribati has been found to be difficult to enforce due to the lack of clarity in definition of "non-biodegradable nappies" (by government and private sector importers) and lack of equipment to assess and enforce biodegradability claims	Currently, the presence of petro-chemical based fasteners and absorbency materials make the products a contaminant rather than a benefit to any potential industrial composting, where such infrastructure is available Studies globally and in Tuvalu are currently exploring the characteristics and feasibility of eco-friendly / compostable diapers. Decision makers in the Pacific are recommended to follow this research
Ensure quality imports of reusable nappies	The social-economic research found that among families using reusable nappies, especially cloth nappies, there is a tendency to opt for the cheapest models that have low quality standards and shorter life A common finding from the technical component of the research found that, when provided with a variety of options and choices, testers valued quality components – i.e., good absorbency performance, adjustable covers – and would be more likely to use those products long-term Implementing quality controls on the import and sale of reusable nappies may increase user satisfaction and therefore their adoption, resulting in environmental benefits	Higher quality products may mean higher upfront costs for reusable nappies* For quality control restrictions to be effective and equitable, it may require accompaniment with significant investment in water and wastewater facilities, incentives and subsidies for reusable nappies and education Government recommended to work with community stakeholders, importers, and researchers to establish effective quality standards. *quality products not always expensive; research found that good and cheap reusable nappies products were available on the Vanuatu market
Implement "levy" (or extended producer/importer responsibility / Advanced Disposal Fee) on importation of single-use disposable diapers	Collect a "levy" on import of single-use disposable diapers to help shift buying behaviour and provide income for government for post-use management of single-use disposable diaper waste. Tuvalu has introduced a AUD0.05c (USD0.03c) levy on the importation of single-use disposable diapers, through Phase II of their *Waste Management (Levy Deposit) Regulation 2019* This levy is in operation and the government utilising the income to undertake in-country product testing with eco-friendly / compostable single-use diaper supplier. The government intends to ulitise the income from the waste levy to subsidise the import of certified compostable diapers.	Examples of levy / extended producer responsibility / Advanced Disposal Fee policies are available on a range of products, including beverage containers, batteries, and waste oil. Introduction of any new policy controls, particularly associated with implementing a levy, are recommended to involve effective two-way consultation with affected stakeholders and communities to obtain feedback, community understanding, and buy-in. recommended to conduct research into existing tax/subsidy examples and test with local communities to set appropriate charges. For quality control restrictions to be effective and equitable, it may require accompaniment with significant investment in water and wastewater facilities and education Note: Participants in government departments in Kiribati and Vanuatu said there were no tariffs applied to single-use disposable diapers (presumably to keep them affordable for families). In Vanuatu, it was found that some retailers pay an import taxation of 15% to customs.

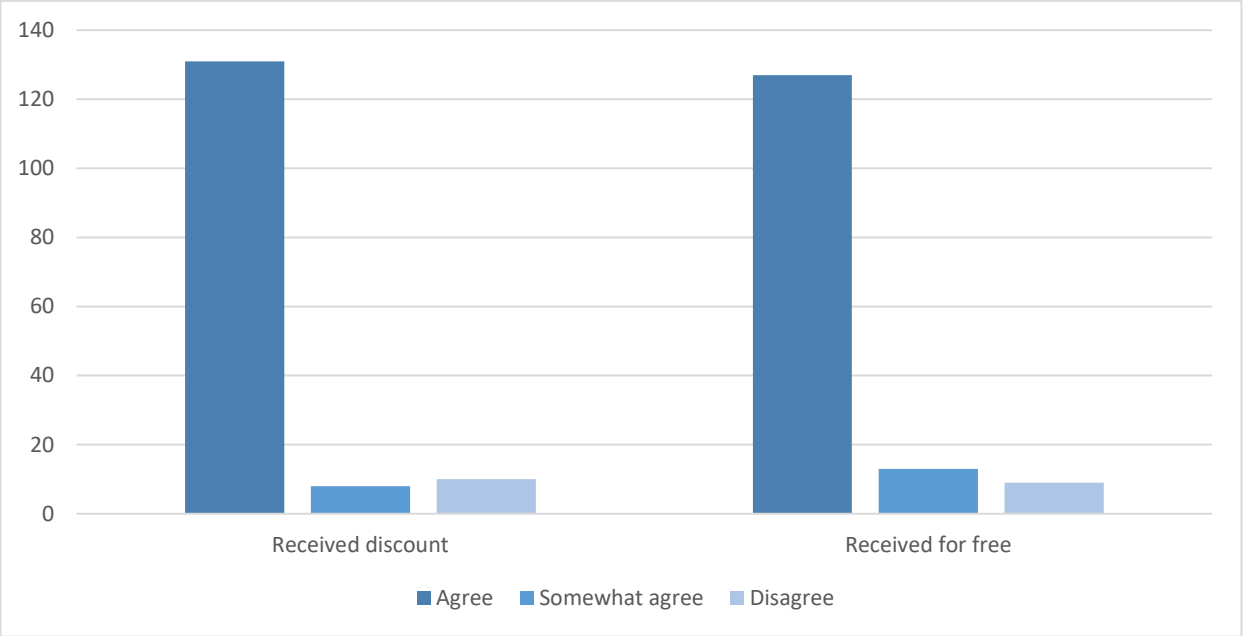
Policy - Subsidies and Incentives

As discussed in *Volume 3*, participants in this research indicated a significant motivation for them to use reusable nappies was associated with receiving an economic benefit to do so, through either receiving nappies for free or at a discount (*Figure 4*).

Decision makers are therefore encouraged to consider policy change to enable incentives and subsidies, which provide a 'carrot' (opportunity for behaviour change), rather than a 'stick' (associated with enforcement of import bans or restrictions).

Incentive programmes, particularly when combined with new infrastructure and education activities, may enable long-term behaviour change.

Figure 4: Reasons that Would Encourage the Use of Reusable Nappies



Policies regarding incentives and subsidies that government decision makers may consider increasing the use of reusable nappies include the following:

- Provide incentives / subsidies / payment plan for purchasing reusable nappies
- Provide payment plans for purchasing reusable nappies
- Negotiated costs from suppliers through group regional buying to reduce cost per unit
- Subsidise washing services

Table 3 discusses these policy opportunities and provides comments on social and economic factors to consider.

Table 3: Policy Opportunities (Incentives and Subsidies) to Increase Uptake of Reusable Nappies

Opportunity	Comments	Considerations
Provide incentives / subsidies / payment plan for purchasing reusable nappies	Up-front costs of quality reusable nappies are seen as a barrier to their adoption. Over 85% of survey respondents indicated if they received reusable nappies for a discount or for free, they would consider their use. Investment in incentives or subsidies for quality reusable nappies, particularly for at-risk community groups and those in low-socio economic areas, may provide equality for households to make the choice for using reusable nappies. Examples of providing incentives for purchase of reusable nappies exist in Australia.	Funding for incentives on reusable nappies could be obtained through a Levy, Extended Producer Responsibility, or Advance Recovery Fee scheme; through aid funded support; or from projected savings associated with waste collection and landfill / dumpsite management. Provision of incentives or subsidies recommend being combined with an ante/postnatal programme and education on how to use reusable nappies effectively – i.e., how to use and wash, safest way to dispose of wastewater etc. Regional buying agreements may be an opportunity for governments to reduce costs negotiate costs from suppliers to standardise costs and supplies and reduce cost per unit in the region Community groups could be encouraged to use a savings programme to establish their own local subsidies / payment plan scheme to support new parents in purchasing reusable nappies.
Inclusion of reusable nappies (and instructions on how to use them) in postnatal kits	Ante/postnatal programmes are an appropriate forum for providing information to new parents on options for diapers and nappies and how to use them correctly Providing quality reusable nappies, particularly to at-risk community groups and those in low-socio economic areas, through an ante/postnatal programme is an opportunity for increase the uptake of reusable nappies	Ante/postnatal programmes providing reusable nappies will have most chance at success if accompanied with clear locally appropriate instructions and information and follow-up contact is provided by public health nurses. A programme proving providing reusable nappies and education will have increased costs for the government or agency proving the ante/postnatal service, and potentially require additional training for the nurses, midwives, and public health professionals delivering the service (costs may be funded through donor partners). Campaigns recommended to be designed with all stakeholders including households, nurses, midwives, and public health professionals.
Subsidise nappy washing services ("nappy library")	The common factor for households to choose single-use disposable diapers is that they are" quick and easy" and the perception of reusable nappies is they are "a lot of work" If governments seek to encourage households to use reusable nappies for environmental benefits, an opportunity to reduce the potential social impacts and subsidise nappy washing service or "nappy library" – collecting soiled nappies and delivering clean reusable nappies. Subsidisation of service can encourage community-based business development The laundering activity has proved economically viable and socially accepted in other countries. Further details provided in Table 4	Investment in establishing / subsidising washing services may have a cost for governments. Costs may be funded through donor partners or can be shared / passed on to households using the service (providing an effective community-based business initiative) Business case recommended to be developed, as discussed in in Table 4

Private Sector – Encouragement of Entrepreneurship Activities

The Private Sector may provide an opportunity to increase services available to communities for management of nappies and diapers. Such entrepreneurial activities may include a nappy washing service or "nappy library", local manufacture of modern cloth nappies, and exploring local material use for reusable nappies (including liners).

Opportunities may exist for the government to provide support for entrepreneurial activities to ensure business are financially viable. Table 4 discusses these opportunities and provides comments on social and economic factors to consider.

Table 4: Opportunities for Entrepreneurial Activities for Improving Management / Disposal of Diapers and Nappies

Opportunity	Comments	Considerations
Establishing reusable nappy washing service ("nappy library")	The perception held by many of reusable nappies being a lot of work, could be mitigated through the introduction of nappy washing services Participants in the research indicated support for using a nappy washing service (but were less supportive of starting the service themselves), provided there were standards agreed to and implemented to avoid any widespread outbreaks of disease By providing a nappy washing service, environmental benefits from fewer single-use disposable diapers can be achieved without negative social effects (i.e., on parents returning to the workforce). Government can assist this entrepreneurial activity through options such as: • releasing Expression of Interest for business to supply service in each community • subsidising set-up or ongoing costs • providing water or infrastructure services • assisting businesses design business case • assisting businesses with marketing and promotion of service Laundering activities have proved economically viable and socially accepted in other countries	Investment to establish a washing service may have a cost for governments. Costs may be funded through donor partners or can be shared / passed on to households using the service (providing an effective community-based business initiative) The introduction of such a service would require guidelines to ensure no cross-infection from bacteria Business case to be developed for each community, considering setup, operating costs, and community willingness to pay. Currently, households are purchasing single-use disposable diapers for USD0.40c and the estimated cost for households to wash a reusable nappy is USD0.02c. At a very high level, there appears to be a potential viable business case for community-based nappy washing services.
Supporting Pacific-based manufacture of reusable nappies or modern cloth nappies (all-in-ones / all-in-twos)	Globally, the uptake of modern cloth nappies is gaining momentum with parents seeking to make environmentally friendly choices while balancing ease and practicality Modern cloth nappies were barely mentioned in the research, likely due to their very limited availability and upfront cost In Vanuatu, with a well-promoted modern cloth nappy variety, access to this product was found in the market research to be limited.	Promotion of modern cloth nappies recommended to be accompanied by an education programme - i.e., rinse excreta into the toilet, dispose wastewater safely, dry nappies in sun to kill E. coli)

Opportunity	Comments	Considerations
	Additionally, few of the internationally manufactured modern reusable nappies were identified. Three known local initiatives, Vanuatu, Fiji, and the Cook Islands, are manufacturing modern cloth nappies in the Pacific region Opportunity to provide higher quality products at an affordable rate Government can assist local manufacture of reusable nappies or modern cloth nappies through options such as: • assisting businesses with marketing and promotion of products • subsidising set-up or ongoing costs of manufacture • subsidising price of modern cloth nappies to ensure affordable for the community • assisting design business case • procuring locally make nappies when implementing any ante/postnatal programme • facilitate promotion of "starter's kit" of local reusable nappies or modern cloth nappies, available from health clinics – with education on how to use them	
Explore designs of reusable nappies (including liners) made locally using local materials	As highlighted in Volume 2, plant fibres and other biological based components found in the pacific such as banana fibre, bamboo, coconut fibre, starch, or chitosan is currently used for making infant hygiene products around the world and has potential to be processed in to locally made biodegradable liners and diapers. Combining modern designs and traditional solutions can increase uptake of consumable products in the Pacific. Manufacturing reusable nappies (including liners) locally using local materials may increase their interest and adoption by community. However, as noted in Volume 3, survey participants disagreed that the use of local materials may be a tool to increase reusable nappy use. Government seeking to assist this entrepreneurial activity may facilitate partnership with research departments, international development agencies and local community initiatives.	Investment in research may have a cost for governments. Costs may be funded through donor partners. Business case to be developed prior to investment, considering setup, operating costs, and community willingness to pay.

Opportunity	Comments	Considerations
Supporting importers and suppliers, including rural suppliers, to make informed product choices on reusable nappy components	Research found limited stocks of reusable nappies, particularly in rural areas. Where reusable nappies were found, it was usually of low-quality standard. Low quality products reduce user experience and increase cost of reusable nappies (three needing to be used at a time) Government can assist suppliers and importers by providing information on preferred reusable nappies components, such as: • initiative to supply reusable nappies as a pack – including plastic clips, covers, and liners (which was found in this research to add significant value to participants' experience) • supply of liners – Survey participants valued the convenience of liners (to improve absorbency and reduce handling of excreta) which could be a major driver for behaviour change • facilitate promotion of "starter's kit" of reusable nappies, available from health clinics – with education on how to use them	Promotion of reusable nappies recommended to be accompanied by an education programme - i.e., rinse excreta into the toilet, dispose wastewater safely, dry nappies in sun to kill E. coli) Higher quality products may mean higher upfront costs for reusable nappies* Government recommended to work with community stakeholders, importers, and researchers to establish effective quality standards. *Quality products not always expensive; research found that good and cheap reusable nappies products were available on the Vanuatu market
Assisting childcare providers to accept babies using reusable nappies	Impact to paid work opportunities is portrayed by participants, particularly in urban communities, as a barrier for the adoption of reusable nappies (the higher use of reusable nappies in rural areas was generally found to be enabled by a stay-at-home parent with strong family support networks). Childcare centres may be reluctant to care for babies with reusable nappies, however, they provide an opportunity, particularly in combination with a nappy washing service to assist the uptake of reusable nappies.	Childcare commitment to using reusable nappies may require infrastructure and potentially require training for the caregivers; or required accompaniment with a nappy washing service. These may have costs for governments or the businesses (costs may be funded through donor partners) Government recommended to work with community stakeholders and childcare providers, to design an effective, safe, and equitable service. The introduction of such a service would require guidelines to ensure no cross-infection from bacteria

Education and Awareness – Messages to Assist Communities

Lack of education and awareness of how to use and benefits of reusable nappies was a common finding across the study. Households in the Pacific learn from peers and family and are guided by their experience. As single-use disposable diapers are currently the common garment used, it may take a coordinated education campaign with several awareness messages for households to consider adopting reusable nappies, even where facilities and services are available. Lack of education was found to be a barrier for the appropriate implementation of locally appropriate options for their safe disposal and management of single-use disposable diapers, at both community and household levels. Opportunities for raising awareness and increasing education were identified using three channels:

- Community decision makers and elders
- Antenatal / postnatal education
- Directly to parents

Each of these channels are discussed below, along with suggestions for messages each can be provided to assist with behaviour change towards management of single-use disposable diapers and adoption of reusable nappies.

Community Decision Makers and Elders

Community elders and leaders (including faith-based organisation leaders) are respected in the Pacific and once provided with accurate information, can be an effective median to consult, communicate, and encourage sound locally appropriate options for diaper and nappy use and disposal in their communities.

The research identified an opportunity for education and awareness provided to community decision makers, elders, and leaders to understand (and therefore be able to communicate) appropriate methods for disposal of single-use disposable diapers and management of reusable nappies. As discussed in *Volume 3*, without guidance on appropriate options, communities will have little choice but to manage waste in whatever way they know and have available. Messages community elders and decision makers can be provided with to reduce impacts environmental impacts from diapers and nappies are provided in Table:5.

Table:5: Messages for Community Elders and Decision Makers

Opportunity	Comments	Considerations
Guidance Document / factsheet on locally appropriate diaper / nappy management "protocols" in communities	Not all Pacific communities have the same access to water and waste collection facilities, and not all decision makers are aware of the most appropriate waste and wastewater disposal methods. An option to provide communities with correct information on appropriate management practises for diapers and nappies, depending on facilities available in a community, may be to develop a factsheet or guidance document that community decision makers and utilise (and adopt). Details to include in the factsheet / guidance document may include the recommended practises and what not to do from **Error! Reference source not found.** and **Error! Reference source not found.** above.	The illustrations on pages 9-11 presents the recommended environmental options for use and disposal of diapers and nappies Implementation of new protocol in communities may require development or investment in infrastructure Community consultation recommended to ensure understanding and buy-in prior to implementing any policy, protocol, or rule

Antenatal / Postnatal Education (and Other Health or Public Health Services)

In addition to community decision makers, the research identified an opportunity for additional education and awareness to be provided through the antenatal / postnatal education, or other community-based health or public health services. Messages health workers can be provided with to reduce environmental impacts from diapers and nappies are provided in Table 6.

Table 6: Messages for Antenatal / Postnatal Education Providers

Opportunity	Comments	Considerations
Inclusion of reusable diapers (and instructions on how to use them properly) in postnatal kits	Ante/postnatal programmes are an appropriate forum for providing information to new parents on options for diapers and nappies and how to use them correctly Providing quality reusable nappies, particularly to at-risk community groups and those in low-socio economic areas, through an ante/postnatal programme is an opportunity for increase the uptake of reusable nappies	Ante/postnatal programmes providing reusable nappies will have most chance at success if accompanied with clear locally appropriate instructions and information and follow-up contact is provided by public health nurses. A programme proving providing reusable nappies and education will have increased costs for the government or agency proving the ante/postnatal service, and potentially require additional training for the nurses, midwives, and public health professionals delivering the service (costs may be funded through donor partners). Campaigns recommended to be designed with all stakeholders including households, nurses, midwives, and public health professionals.
Education campaign / awareness training for healthcare and public health workers on how to use and manage reusable nappies	Survey participants suggested education was needed to improve knowledge and awareness of the use and benefits of reusable nappies Opportunity for providing information through public health workers and local health clinics	A programme proving providing reusable nappies and education will have increased costs for the government or agency proving the service, and potentially require additional training for the nurses and public health professionals delivering the service (costs may be funded through donor partners). Campaigns recommended to be designed with all stakeholders including households, nurses, midwives, and public health professionals.
Development of context specific factsheets, posters, and tools – and provide on social media	Posters, factsheets, and information on social media was suggested by participants to improve awareness of the use and benefits of reusable nappies Existing posters were highlighted, for example the UNICEF "F-diagram" (faeces, fingers, flies, fields, fluids, food), showing pathways of faecal–oral disease transmission, indicating this medium is an effective one Many young parents in the Pacific use social media, suggesting any messages should be disseminated on this platform	Designing and developing factsheets, posters and messaged for social programme may be funded through donor partners. Design educational campaigns with carers, clinicians, waste managers

Community Education

Many actual and perceived barriers against adoption of reusable nappies were found through this study. The technical research (*Volume 3*) summarises the barriers and found many of the perceptions are misguided. Education is recommended to remove myths and provide information on how and why to use reusable nappies.

Education can be tailored towards young parents, however as participants in the study were found to listen to community leaders and draw on experience from elder women for information and support, educational campaigns are suggested for all community members. Messages recommended for the community are centred around "myth-busting" the incorrect perceptions found through this study and providing the facts. Suggested topics are provided in more detail in *Volume 5*.

Avenues recommended for community messages include:

- Group education sessions (involving family and peer groups so parents are hearing the same messaging and can support each other)
- Social media (Tik-Tok, Facebook)
- Guidance from community leaders and elders
- Education from antenatal

Do Not: Dispose single-use disposable diapers in Waterways, Oceans, or the Environment

Single-use disposable diapers may take **500 years to break down** in the environment. They can release chemicals and bacteria and may entangle land and marine animals. When single-use disposable diapers eventually start to decompose, they break into smaller particles called "**microplastics**", which can be eaten by fish and end up in food eaten by us.

Do Not: Dispose single-use disposable diapers in areas near water supply and gardens

Single-use disposable diapers in the environment may release chemicals such as dioxins, heavy metals, and bacteria from the baby excreta into the soil and water. These chemicals may end up in gardens and can **spread pollution and disease**.

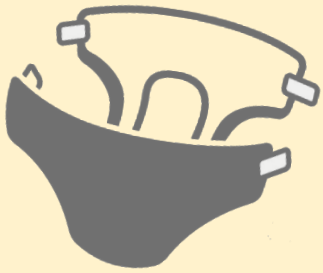
Do Not: Burn single-use disposable diapers

Burning of single-use disposable diapers will **emit dioxins and toxic fumes**. These fumes may affect our health and may spread into the surrounding environment (*into food and water sources*). Bury used diapers in controlled, covered pits.

Do Not: Dispose reusable nappies wastewater near groundwater, water supplies and gardens

Untreated wastewater, including from washing reusable nappies, has the potential **spread disease and contaminate soil and drinking water** sources. Most outbreaks of waterborne illnesses can be traced to wells or water supplies. contaminated by sewage.

Key Perceptions of Single-Use Disposable Diapers in the Pacific



Single-use disposable diapers

Are commonly available and cheap

Available, YES – commonly found in all stores in both rural and urban areas.

Cheap, NO – families may spend over **USD500 per year** on single-use disposable diapers for **one child**

Baby excreta is not harmful and therefore single-use disposable diapers in the environment do not have a negative effect

NO, discarded diapers may take **500 years to break** and can **pollute soil & oceans** and baby excreta can be a source of bacteria

Are higher performing and can be kept on babies for a long term

YES, the quality and performance of single-use disposable diapers was found to be widely accepted.

However, the perception that single-use **disposable diapers stay dryer on a baby for longer is a common misperception.**

This practise may impact

- the health and development of babies
- their ability to balance and walk
- can cause urinary tract and other infections

Burning is a good way to remove the waste

NO, can emit dioxins and toxic fumes, and **affect our health**

Eco-friendly / compostable single-use diapers compost easily

NO, there are currently no known eco-friendly / compostable diapers on the market able to claim 100% biodegradability or compostability. **Eco-friendly / compostable single-use diapers do not degrade / compost naturally** in the environment; **they need specialist infrastructure such as controlled high temperatures and microbial composting facilities**

Key Perceptions of Reusable Diapers in the Pacific

Reusable diapers

People who use reusable nappies are poor

NO, families choosing reusable nappies do so also for social (health) and environmental reasons

Reusable nappies can also be seen as a "**wise household choice**" that can free up budget for other activities

The upfront costs of reusable nappies are expensive

Upfront costs can be as **little as $54** for common flat / cloth square reusable nappies.

Use of reusable nappies may represent a **saving** of at least **USD1,377 over 3 years**.

Wastewater from reusable nappies is not a risk to public health

NO, without management, reusable nappies wastewater disposal sites can be a source of **E. coli** and other **health effects**

Reusable nappies are hard to clean and hard to dry

The technical testing found that reusable nappies were generally found to be **easy to wash and dry.**

Participants liked microfiber inserts (*even if they had to be doubled*), due to washing and drying

Reusable nappies only include the old-style cotton flat towels

NO, reusable nappies can now come with many "accessories" including plastic clips, covers, and liners to assist user experience.

Also available are '**modern cloth nappies'**, that are fitted premade designs similar in design to single-use disposable diapers.

Reusable nappies are less effective than single-use disposable diapers

NO, study participants found that the level of **absorbency** / leakage found in reusable nappies was generally **good**, except for the cheapest products.

If I use reusable nappies, I have to use them all the time

NO, a combination approach may be appropriate for many households – i.e., *using reusable nappies when at home during the day, but using disposable diapers when travelling, at events, and during the night*

Using reusable nappies will limit my ability to work

NO, options may be available assist parents when using reusable nappies, include a nappy washing service and/or assisting childcare to use reusable nappies.

Also using a combination approach may be appropriate – disposable diapers used on babies when parents are at work.

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