THE UNIVERSITY OF MELBOURNE

A ‘Qualitative Business Case’ For One Health Investments

Nossal Institute for Global Health

EID events are highly **unpredictable.**

Reasonable estimates, confidence intervals and probabilities associated with the following are not readily available:

- The source of risks
- The reproduction rate, case fatality rate and range of vulnerable species for a novel zoonosis (that has not yet emerged)
- The reproduction rate and case fatality rate of a new antimicrobial resistant infection, the existence and efficacy of second- and third-line antimicrobials
- The characteristics of eco-system damage and its implications for animal and human health associated with a catastrophic environmental event.

These and other targets of One Health prevention investments are not quantifiable risks, in the sense that we can undertake formal cost-benefit analyses to justify the volume of One Health investment.

- Alternative strategy to formal cost-benefit : ‘qualitative’ business case for One Health.
- Construct plausible and/or expert-predicted scenarios
- Identify a range of "One Health interventions"* that have the objective of reducing the risks of those scenarios
- Establish the evidence base risk reduction; project
- Demonstrate that under plausible estimates One Health investments are likely to yield very high rates of return.

*One health interventions can have multisectoral input or multisectoral output

Relevant economic principles

Inefficiencies in resource allocation
Public goods and externalities
Economies of scope and joint production
Distributional considerations
Incentive compatibility

Economic principle
Inefficiencies in resource allocation

Inefficiencies in resource allocation exist where a redistribution of resources would produce an improved overall outcome

Example: Schistosomiasis control in China

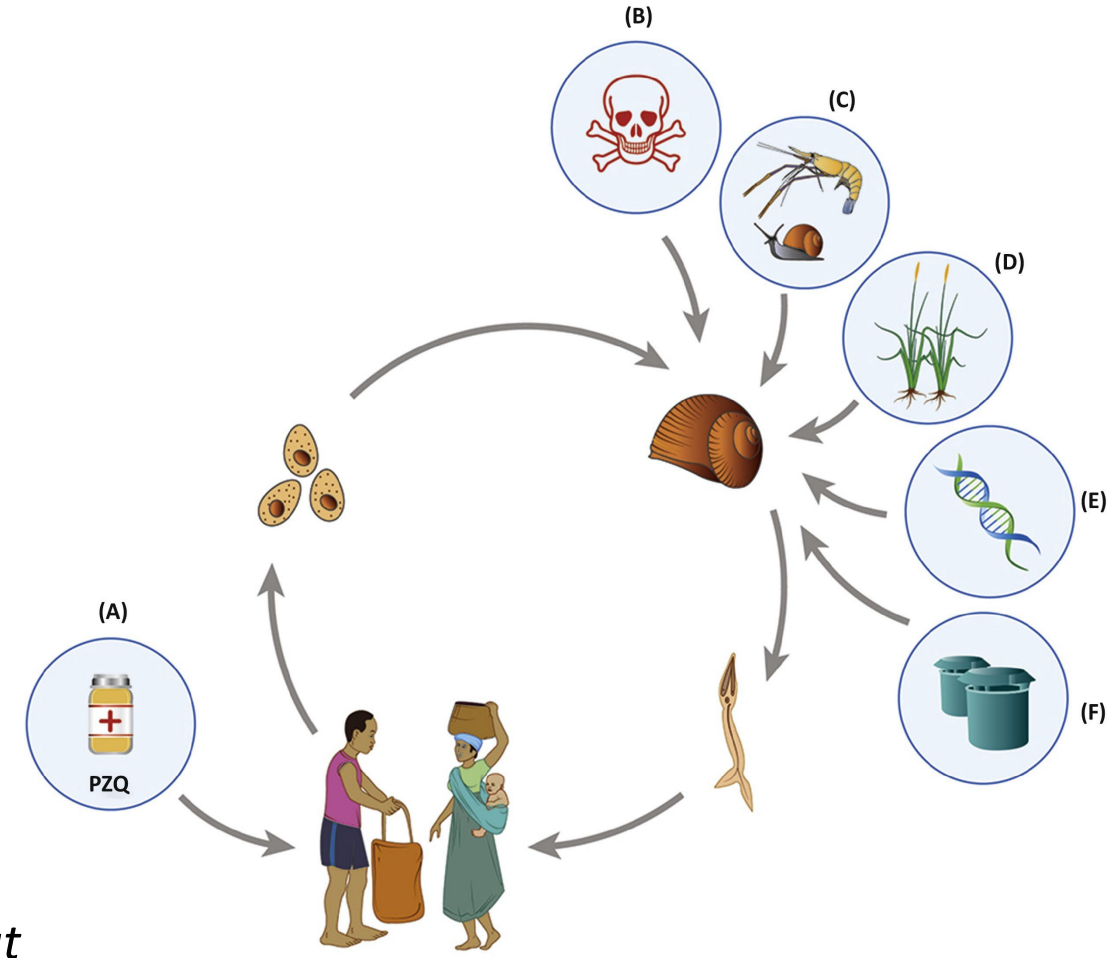
Location/Year: China,1999

A new mitigation program for schistosomiasis integrated

- *case detection and morbidity control in humans,*
- *molluscicide treatment,*
- *health education, surveillance,*
- *environmental management and livestock control initiatives*

The integrated program created a net benefit for society of US$6.20 per US$1 invested.

This means that reallocating resources from any activity that renders less than 6.2:1 return is an efficiency improvement



Economic principle
Public goods and externalities

Public goods and externalities exist where the benefits of an investment are not received uniquely (externality) or even preferentially (public good) to the investor

Example: COVID vaccination

Summary: The benefits of vaccination are distributed between the person vaccinated (preferentially) and the rest of the community (**externality**): most governments are trying to distribute vaccines free

A vaccinated community will not produce mutations that are more virulent than earlier viral forms. This is a **global public good**s, benefiting everyone equally; there are strong incentives for regional and global solidarity in vaccine distribution

Economic principle
Economies of scope and joint production

Doing two or more things together produces a larger benefit or a lower cost than doing them separately

Example: Human and animal vaccination delivery to remote nomadic communities

Location/Year: Chad, 2005

Summary: *A joint human-livestock campaign delivered*

- *Vaccination for anthrax, blackleg, contagious bovine pleuropneumonia and pasteurellosis for animals*
- *Vaccination for pertussis, tetanus, diphtheria and polio for humans in a single campaign.*

An evaluation of costs indicated a 15 % reduction in operational costs compared with separate vaccination campaigns PLUS benefit from increased vaccination of humans (savings for human healthcare system).

Economic principle
Distributional considerations

The costs and benefits of an intervention are not shared evenly producing unfairness and incentives not to cooperate with the measure

Culling of animals (without compensation) concentrates costs among the owners of culled animals but distributes benefits across all animal owners and society as a whole.

Owners of sick animals are likely to try to evade the cullers.

Needs design of incentive compatible solutions.

Thousands protest Indonesia pig culling

Economic principle:
Incentive Compatibility of Policies

Incentive compatibility requires that everyone who needs to cooperate in an intervention gains from doing so

Example: Sikkim Anti-Rabies and Animal Health program

Location/Year: India, 2017

Summary:

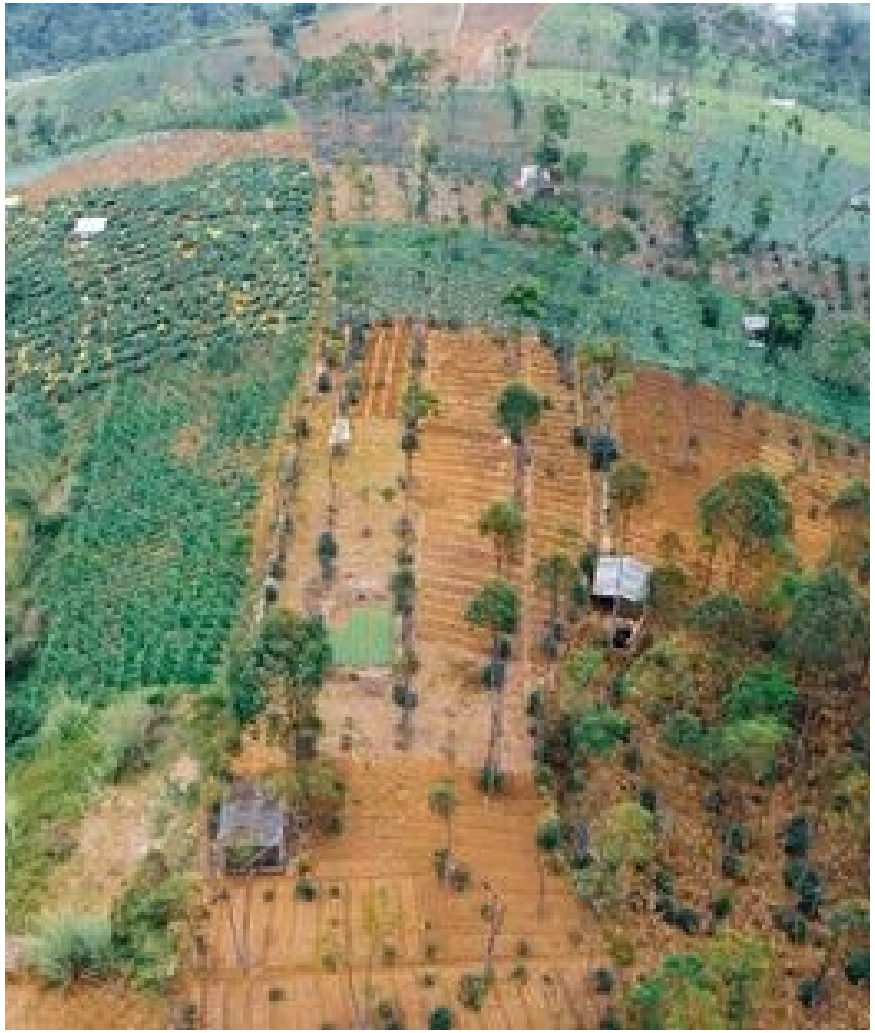
- *Good engagement with local communities led to them assisting the project with presenting dogs and dog catching.*
- *Dog population management helped to control rabies but also addressed community concerns about dog fighting and nuisance, and unwanted puppies. B*
- *efore program began (2005), human rabies incidence in Sikkim was 0.74 deaths per 100,000 persons, resulting in 4 human deaths. After the program began in 2006, there were no reported cases of human rabies until 2016.*

Economic principle:
Incentive Compatibility of Policies

Example: Health care access and logging in Indonesia

Summary:

- *Paying for healthcare was thought to be a key driver for people to engage in illegal logging*
- *Providing subsidized healthcare led to reduced logging and even reforestation (as planting of trees was accepted as payment for healthcare).*



Approach to the qualitative business case

Case studies representing three types of investment

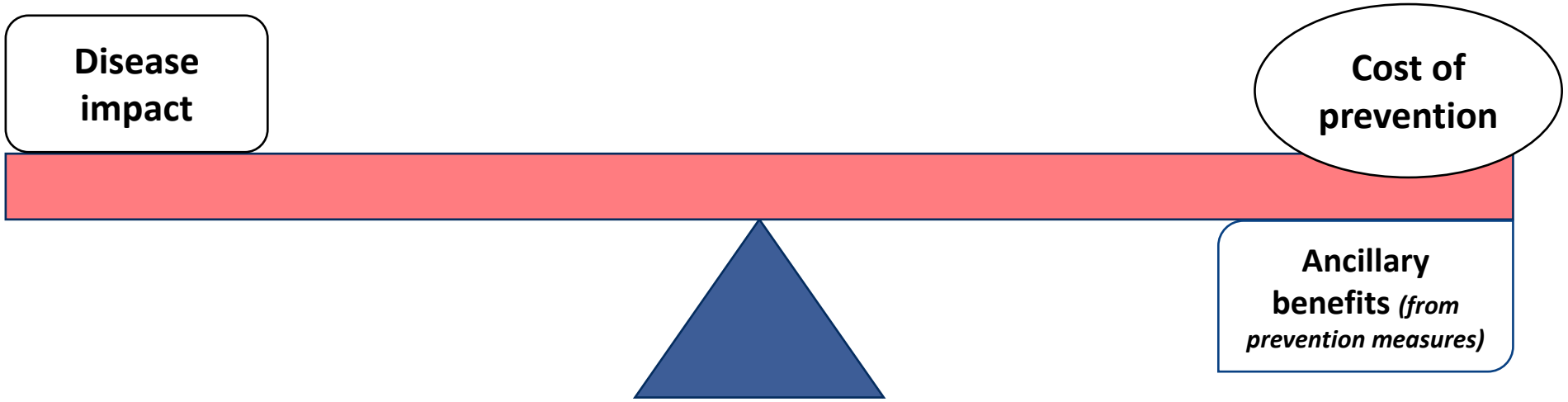
1. Disease control
    - Schistosomiasis control in China?
    - HPAI prevention in Thailand?
    - COVID19 prevention in the Wuhan wet market?
2. Management of antimicrobials
    - Regulating antibiotics in animal feed in Laos?
    - Reducing antibiotic prescription in Myanmar?
    - Eliminating malaria in an anti-malarial resistant context such as Cambodia?
3. Management of natural resources
    - Reducing sand mining in the Mekong river?
    - Slowing desertification and deforestation in China?
    - Managing fishing rights in the Mekong region?

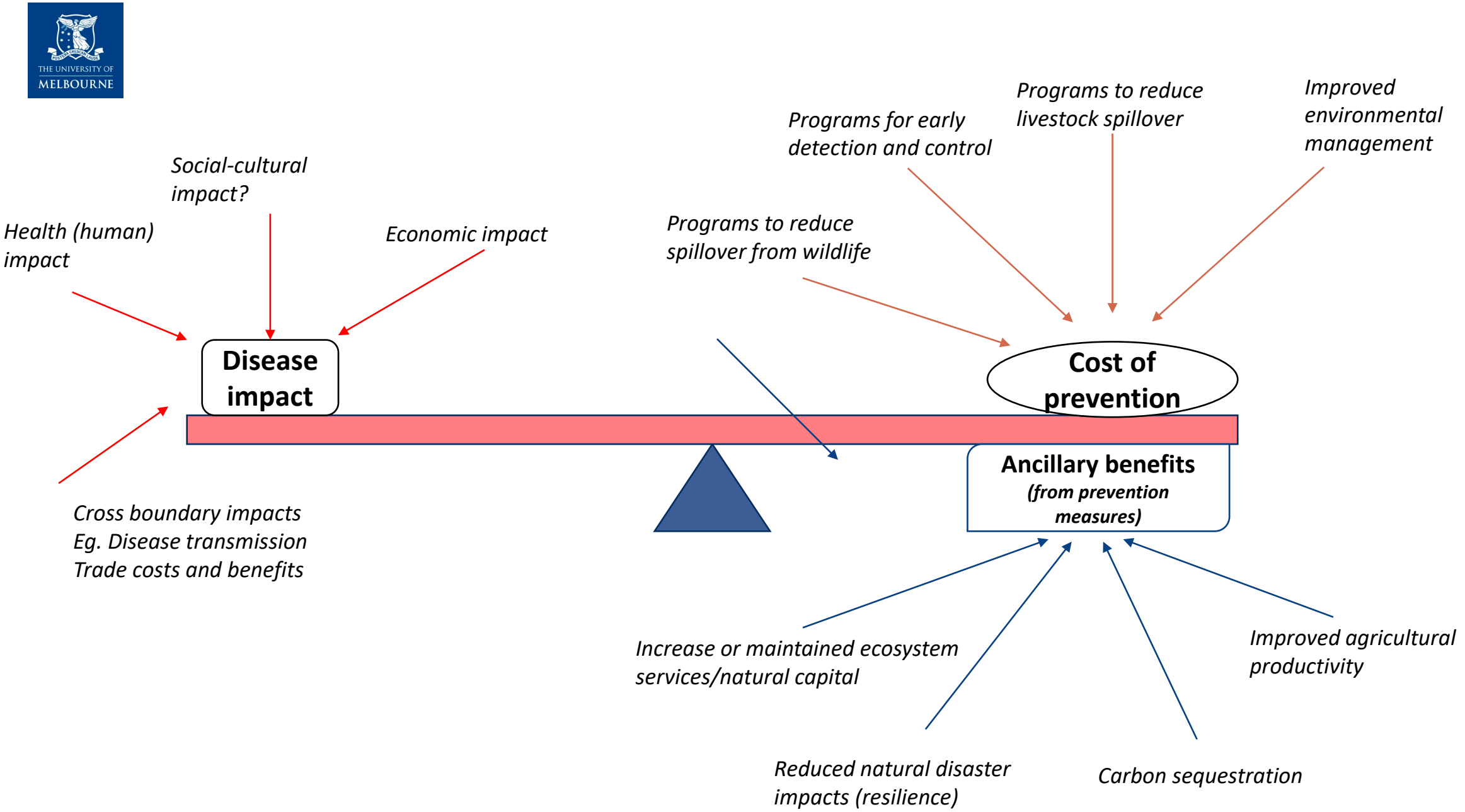
Schemata for the case study

1. What are the available interventions?
2. What robust evidence is there about:
    (a) their costs
    (b) their impacts?
3. What are the gaps:
    (a) in relation to quantified estimates of specific types of costs and impacts
    (b) in relation to types of costs and impacts that may have been ignored by economic evaluations?
4. Can experts reach consensus to arrive at estimates of quantities, where there are gaps?
5. How do different types of interventions interact with each other to change levels and types of costs and impacts?

Case Study One: Disease Control

Reducing the risk of Emerging infectious diseases/Pandemics




Programs for early detection and control
Programs to reduce livestock spillover
Improved environmental management
Social-cultural impact?
Health (human) impact
Economic impact
Programs to reduce spillover from wildlife
Disease impact
Cost of prevention
Ancillary benefits
(from prevention measures)
Cross boundary impacts
Eg. Disease transmission
Trade costs and benefits
Increase or maintained ecosystem services/natural capital
Improved agricultural productivity
Reduced natural disaster impacts (resilience)
Carbon sequestration

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Thank you

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