Current & Emerging Challenges of Poultry & Possible Solution

Dr Harshakumar Shetty

Food and Agriculture Organization of the United Nations

IFAD International Fund for Agricultural Development

unicef

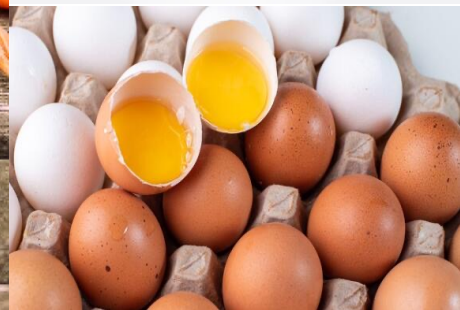
WFP World Food Programme

World Health Organization

2022

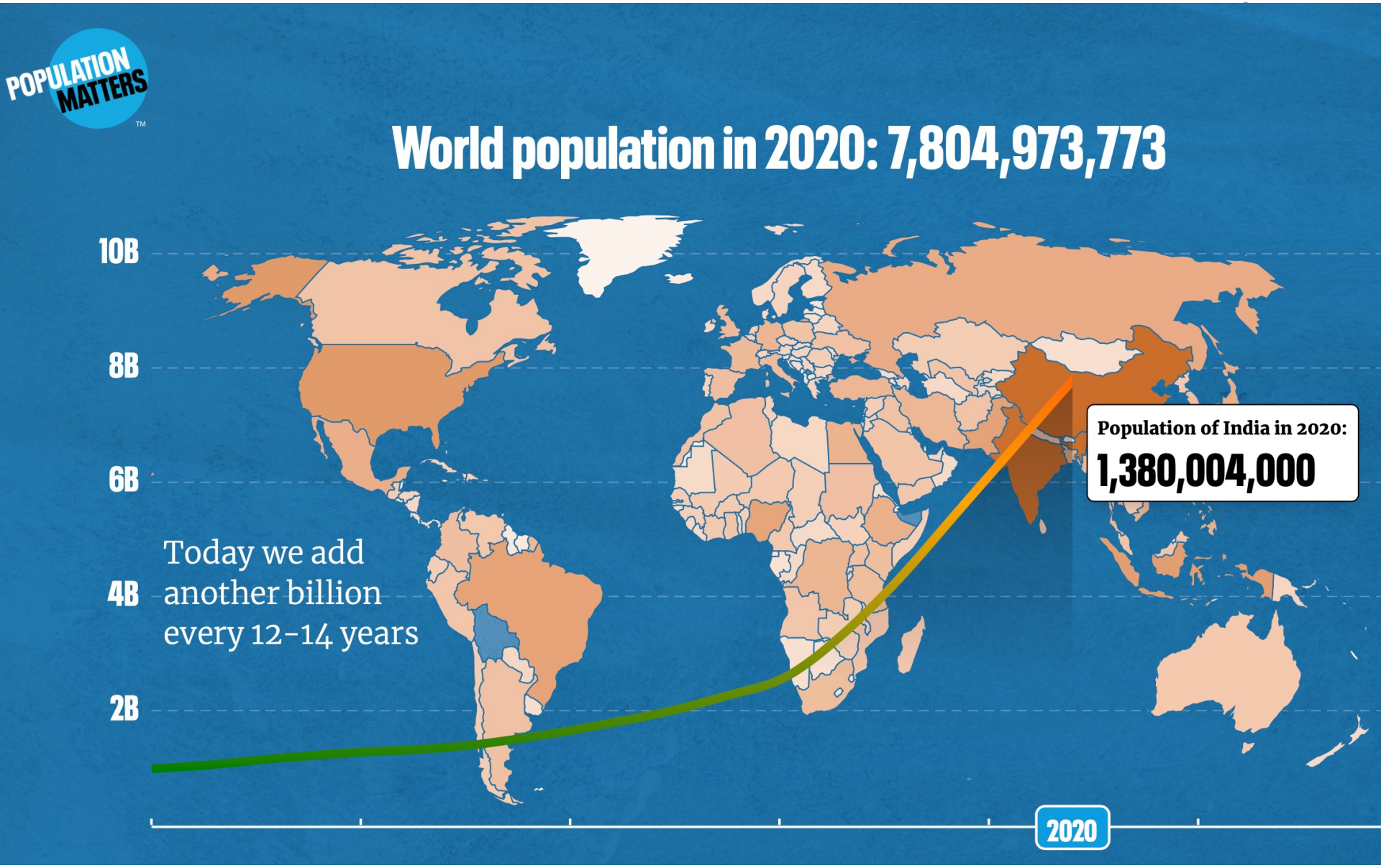
THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

REPURPOSING FOOD AND AGRICULTURAL POLICIES TO MAKE HEALTHY DIETS MORE AFFORDABLE



Nutrition Security

Protein Security



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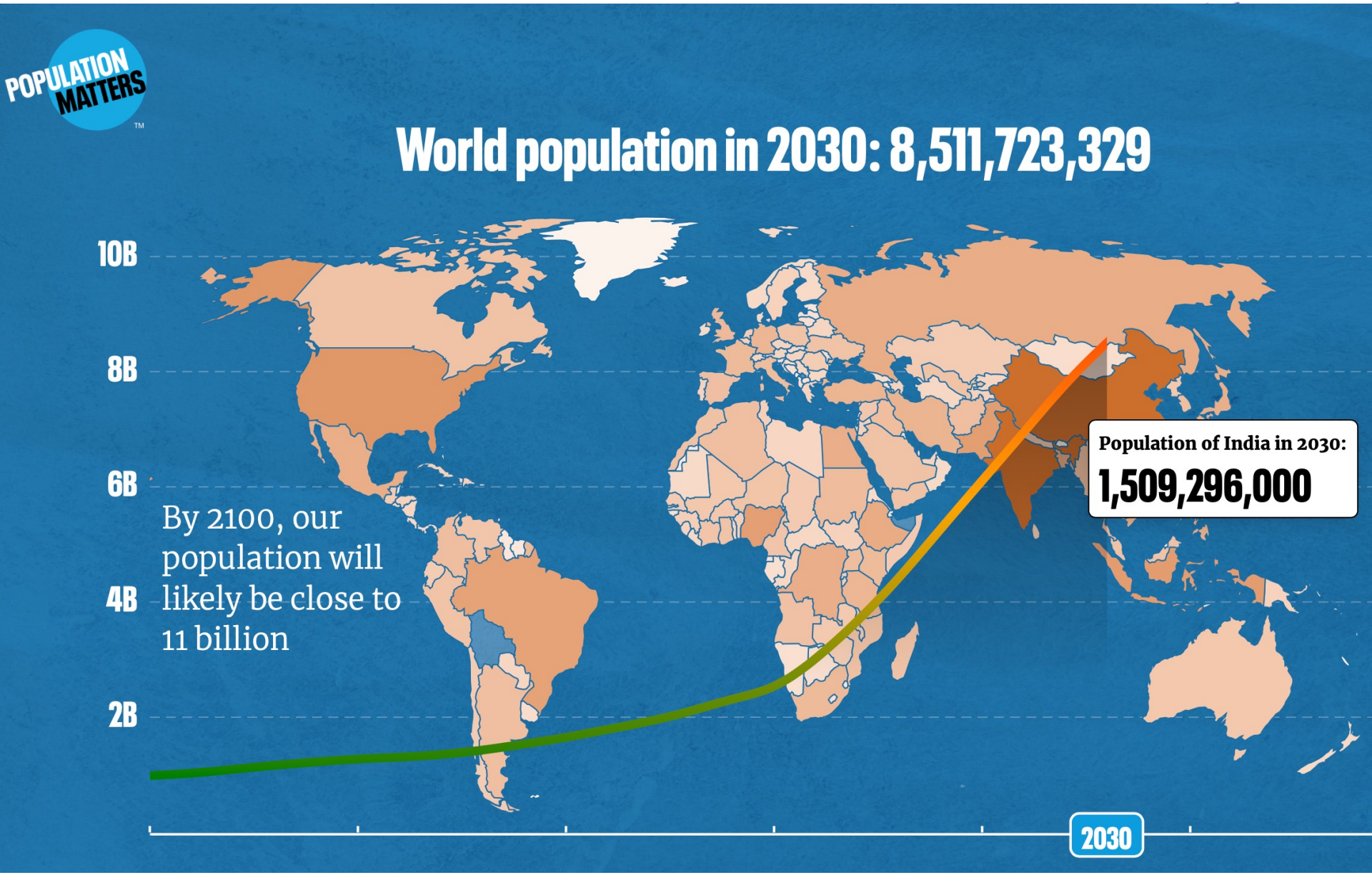

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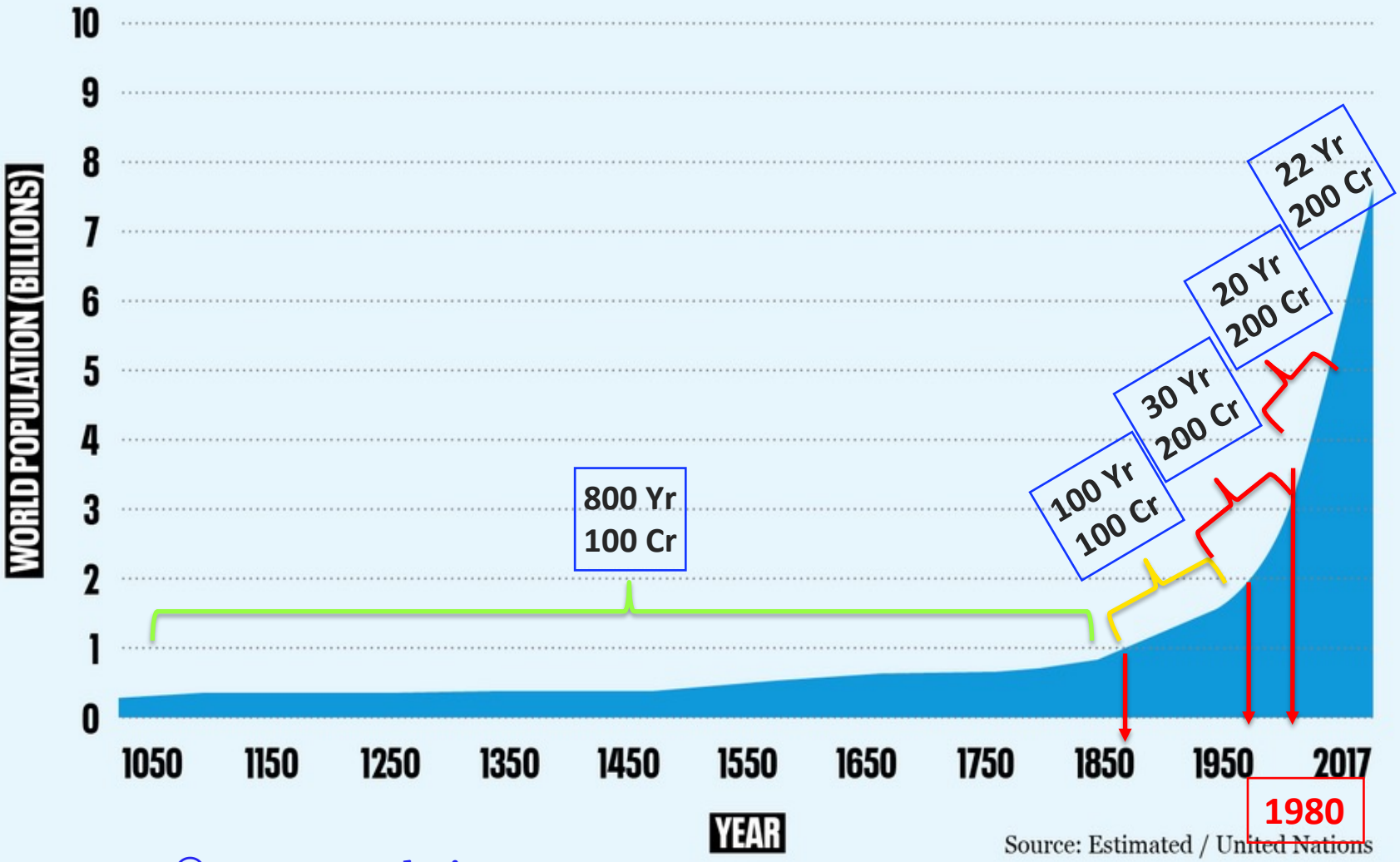
Poultry Meat & Egg

- FAO: By 2030, poultry meat will be 40% of total meat consumed globally.
  - ✓Healthy Protein source
  - ✓Affordable,
  - ✓Versatile,
  - ✓Sustainable
  - ✓No cultural/religious taboo,
  - ✓L

MOST FAVOURITE SOURCE OF PROTEIN

HUMAN POPULATION GROWTH



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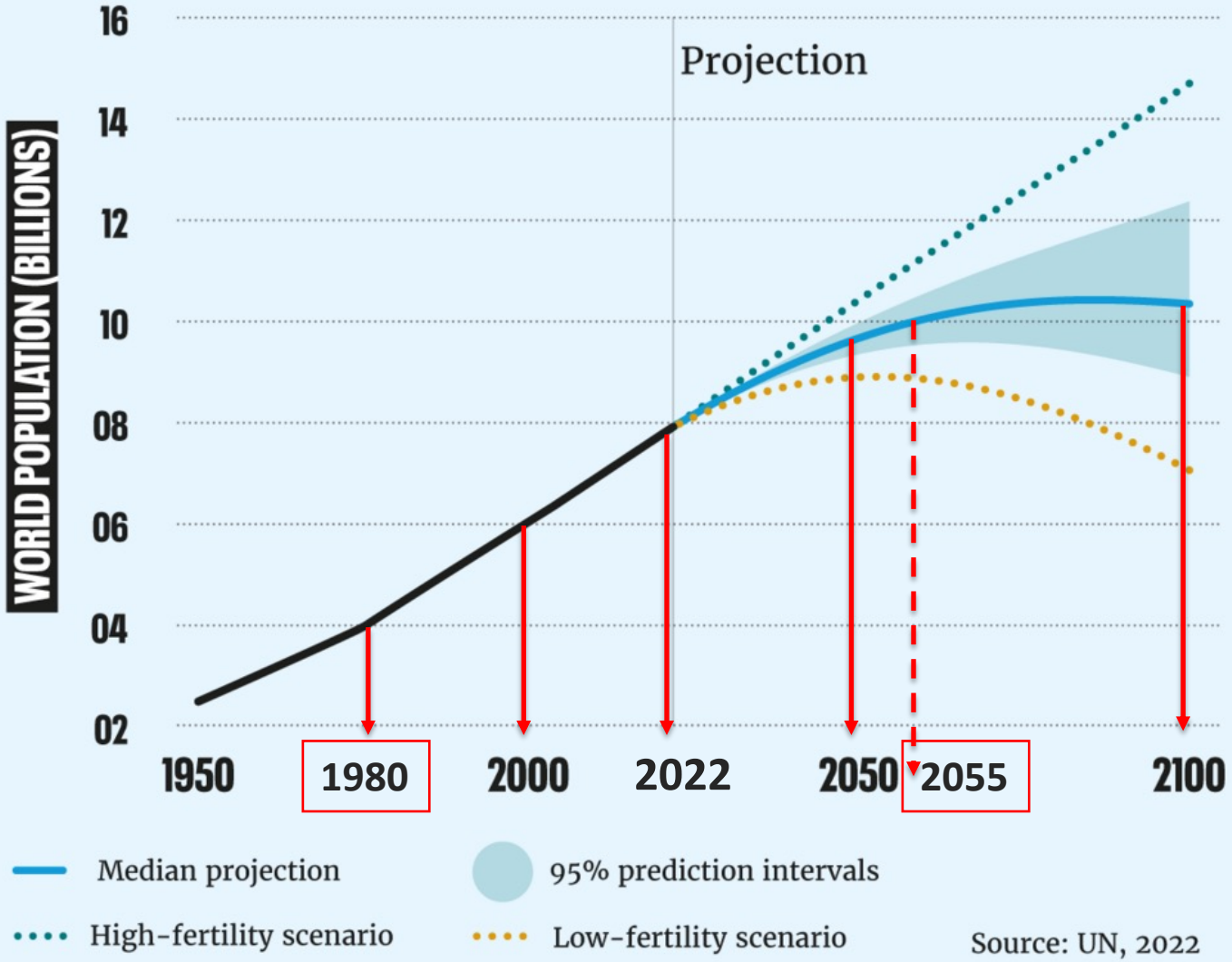
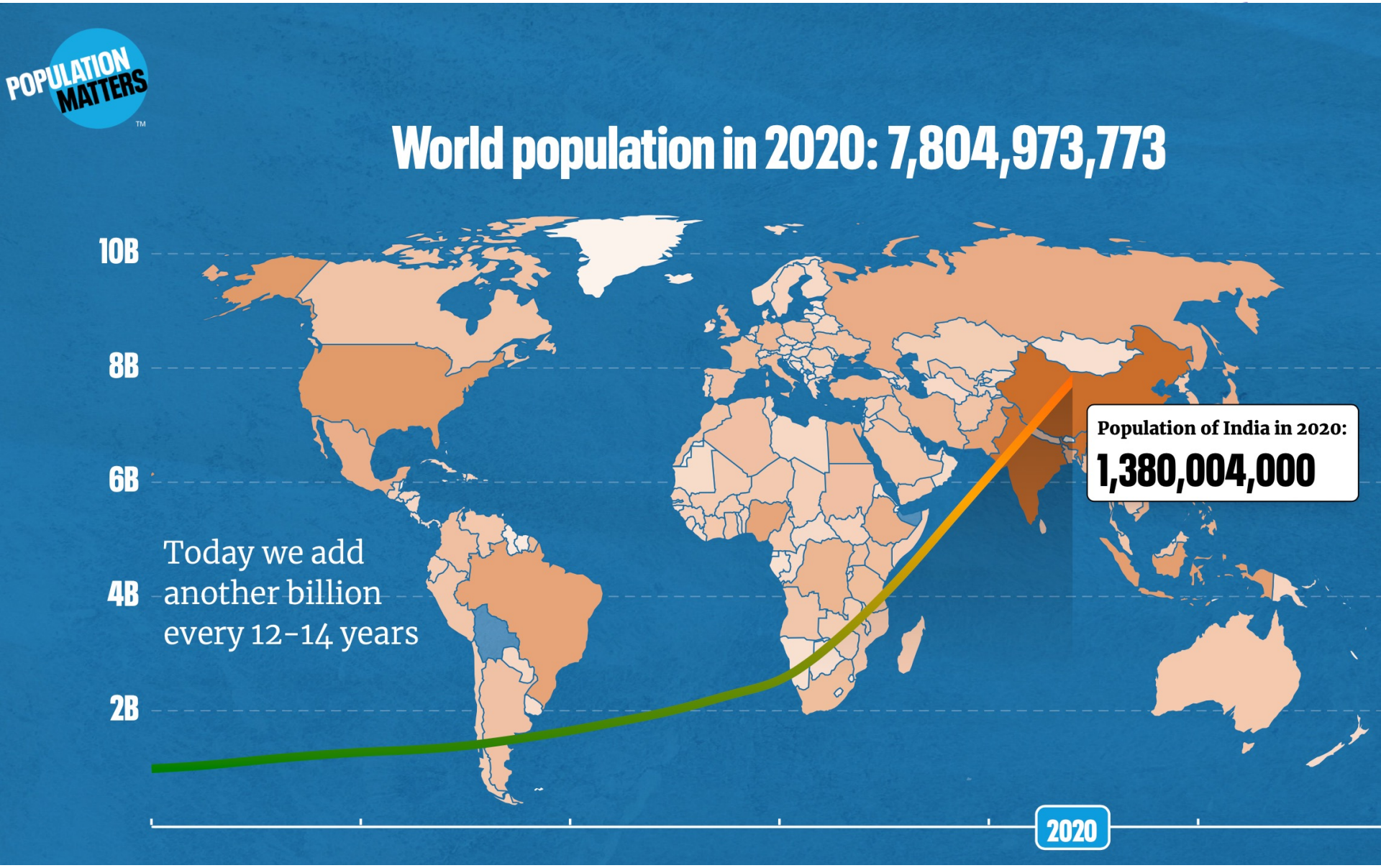
UNITED NATIONS POPULATION TO 2100: 95% CERTAINTY RANGE





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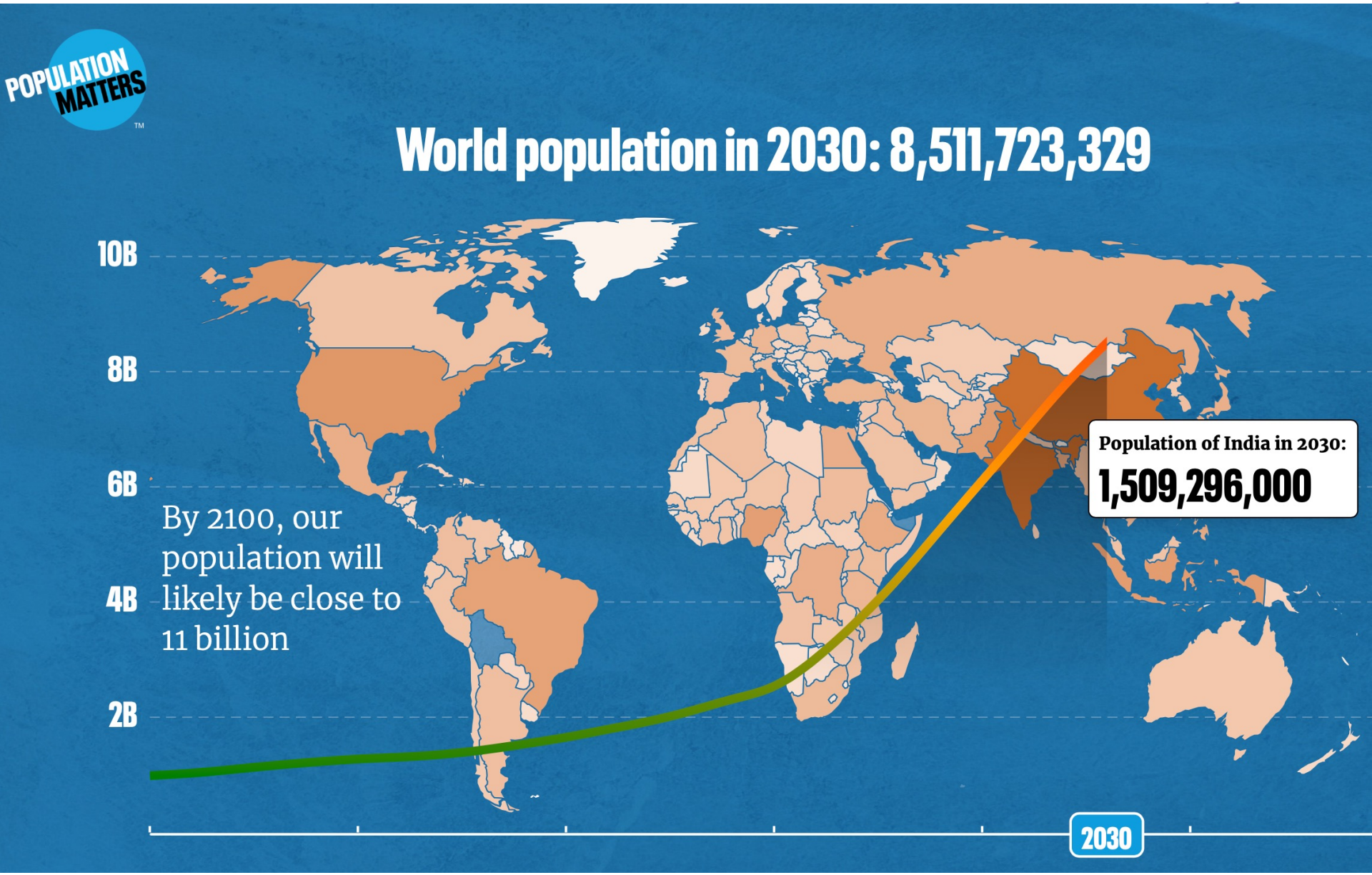

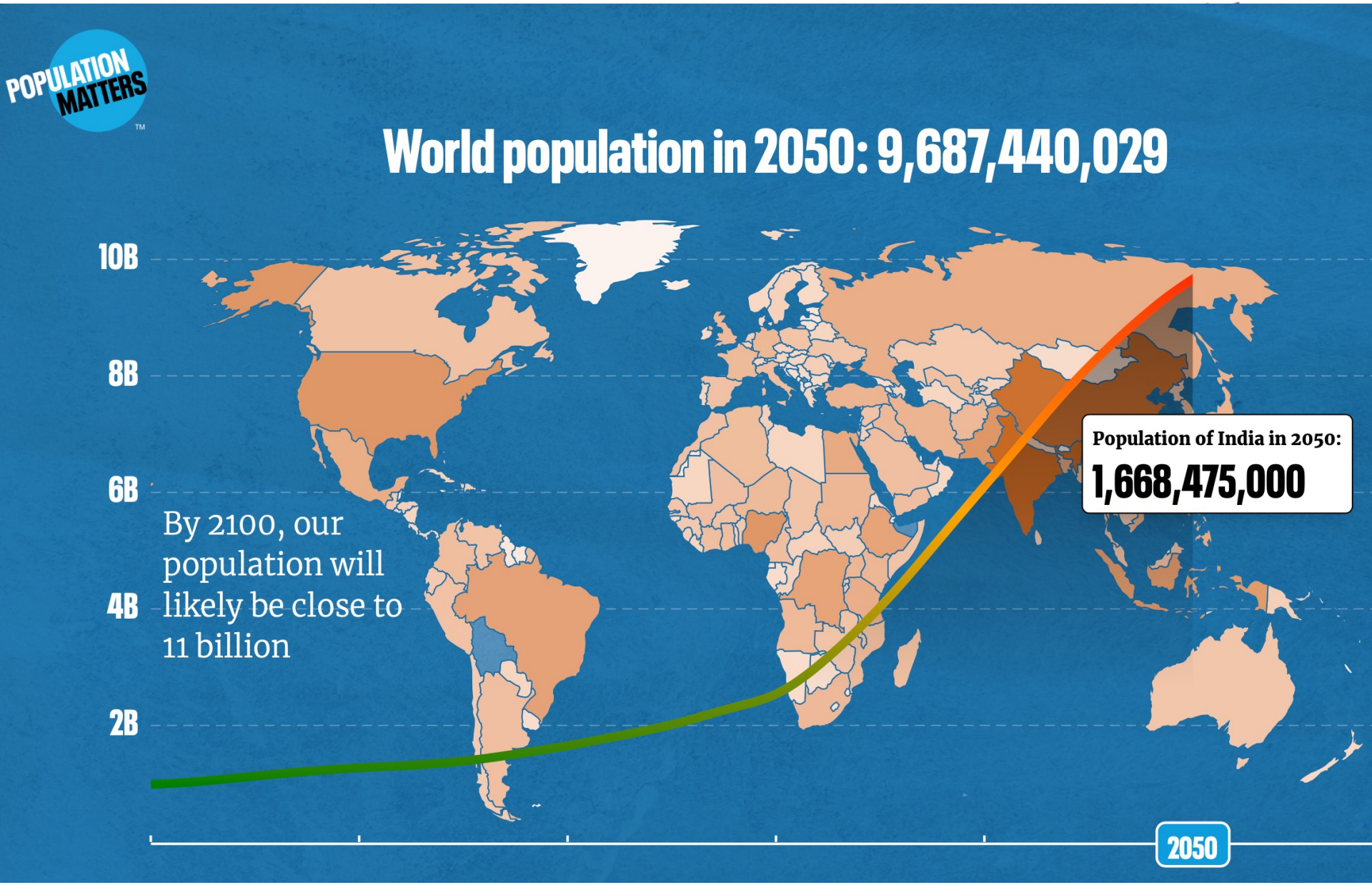

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Per Capita Chicken meat & Egg consumption / Year

2022: 5.3 Kg (713 +21 Cr Kg/139 Cr population)

(Broiler DOC placement – 40 Cr/Month)

2030: 7.2 Kg (1060 +30 Cr Kg/150 Cr population)

(Estimated Broiler DOC placement – 59 Cr/Month)

(assuming annual growth of 5% YOY)

Impact of Population Explosion?

"Environmental Crisis"

- Climate Change
- Biodiversity loss
- Natural Resource depletion (water, minerals)

??????

POPULATION MATTERS

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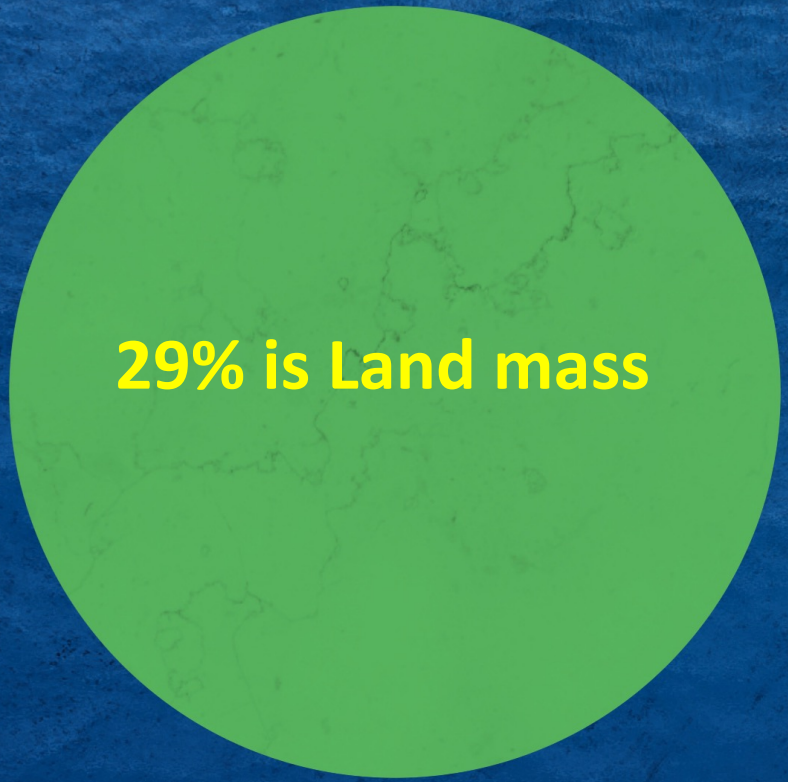
71% is covered by water



OUR EARTH

Most of the earth's surface is water. Only 29% of it is land.

Let's zoom in and see how this land is used, and by whom.

POPULATION MATTERS

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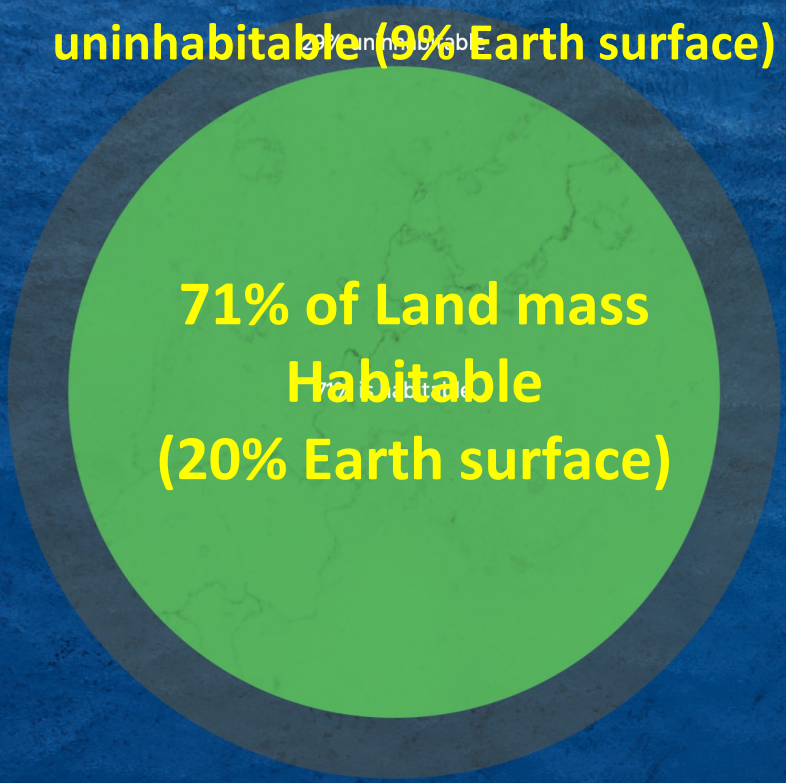
29% of Land mass is uninhabitable (9% Earth surface)



71% of Land mass Habitable (20% Earth surface)

OUR EARTH

First of all, not all of this surface is habitable. 10% is glaciers and 19% is barren land where life can barely exist.

Let's see how this habitable land is used.

POPULATION MATTERS

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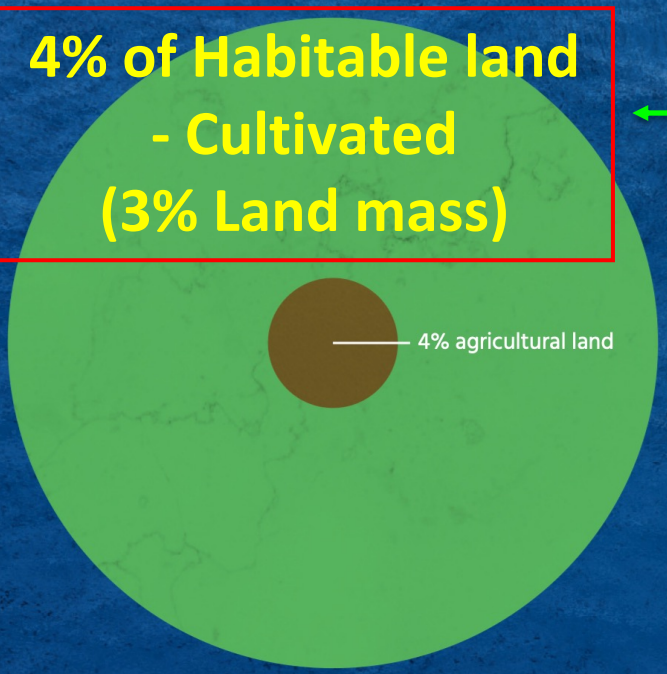
4% of Habitable land
- Cultivated
(3% Land mass)



1,000 YEARS AGO

1,000 years ago, less than 4% of the habitable land area was used for farming. The rest was wilderness.

But over the past few decades, wild habitats have been squeezed out by agriculture to feed our growing population.

Courtesy:© 2023 Population Matters

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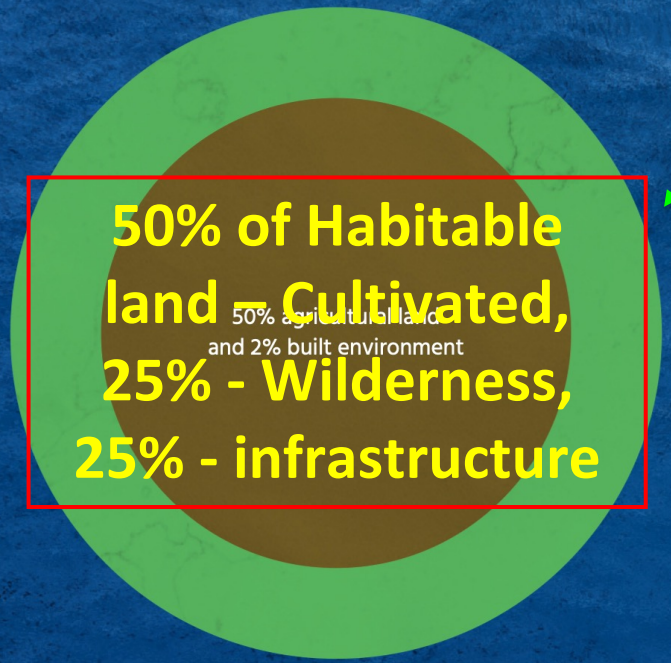

TODAY

Today, half of all habitable land is used for agriculture. And 2% is built infrastructure.

Courtesy: © 2023 Population Matters

POPULATION MATTERS

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60% of Habitable land – Cultivated, 35% - Infrastructure 10% - Wilderness,

???????

BY 2050

Habitat for wild species continues to shrink as our population grows, mainly due to agriculture.

Only one quarter of land is relatively undamaged by human activity. This is projected to decrease to just one tenth by 2050.

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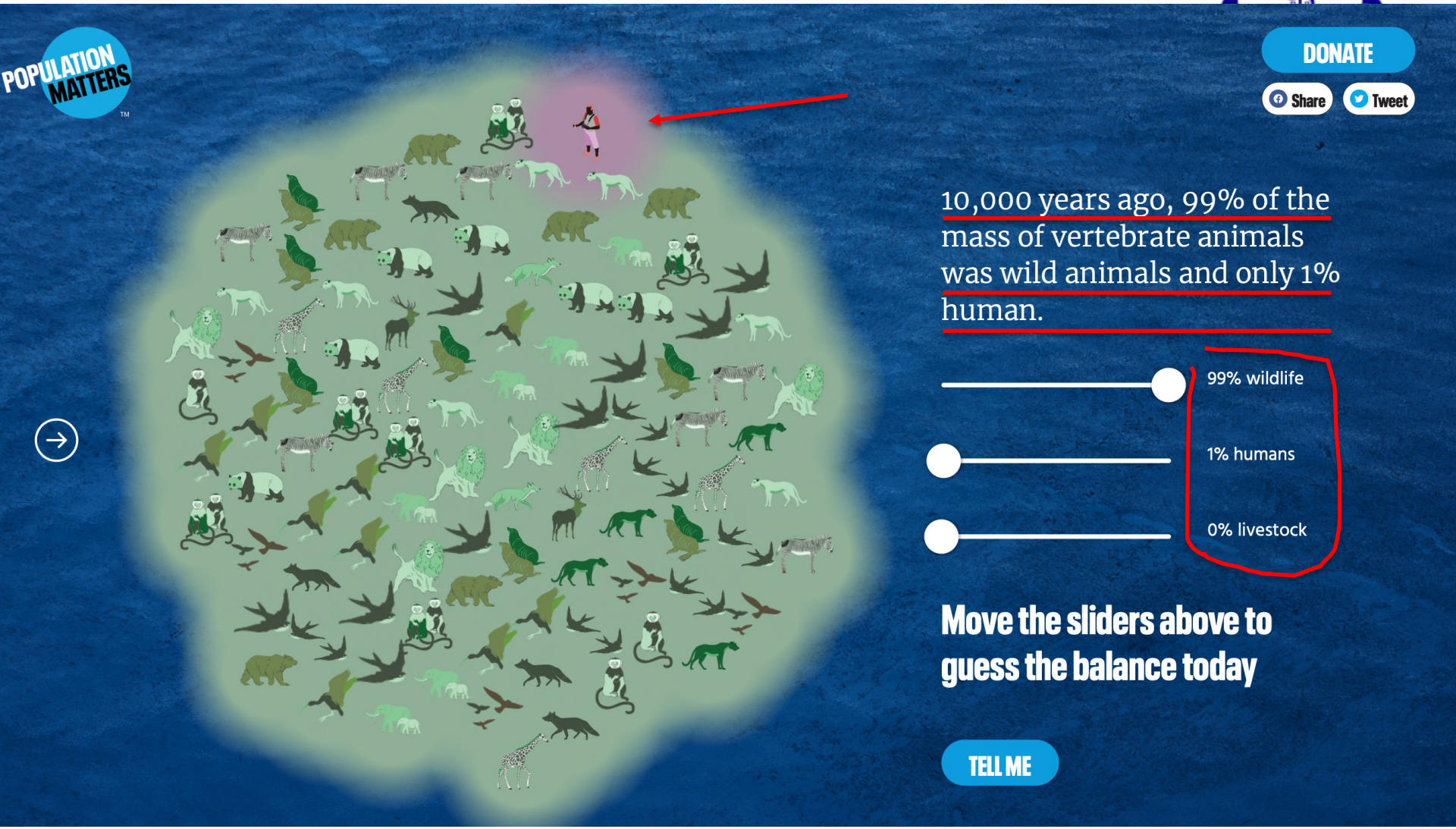

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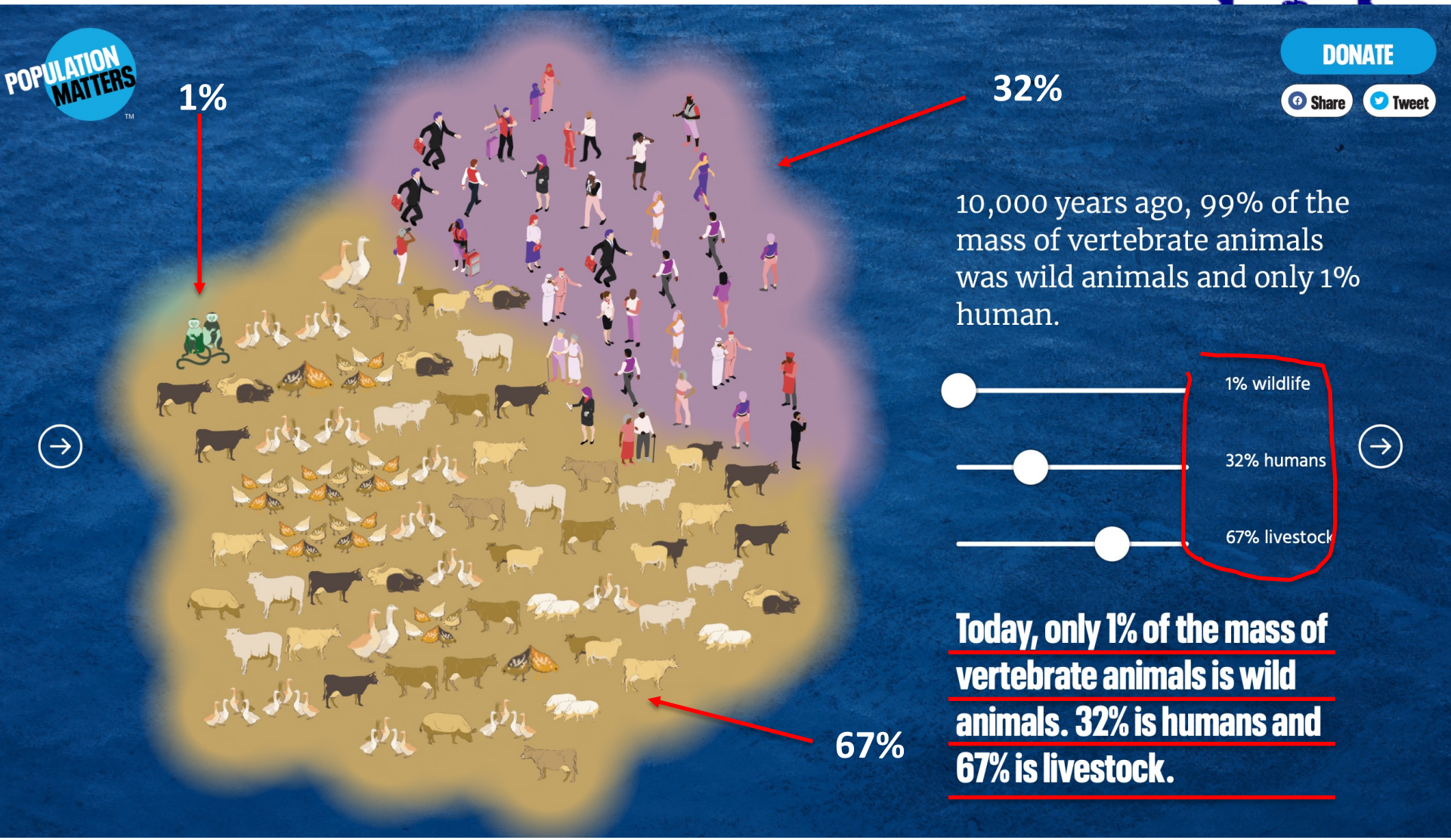

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Impact of Population Explosion?

POPULATION MATTERS

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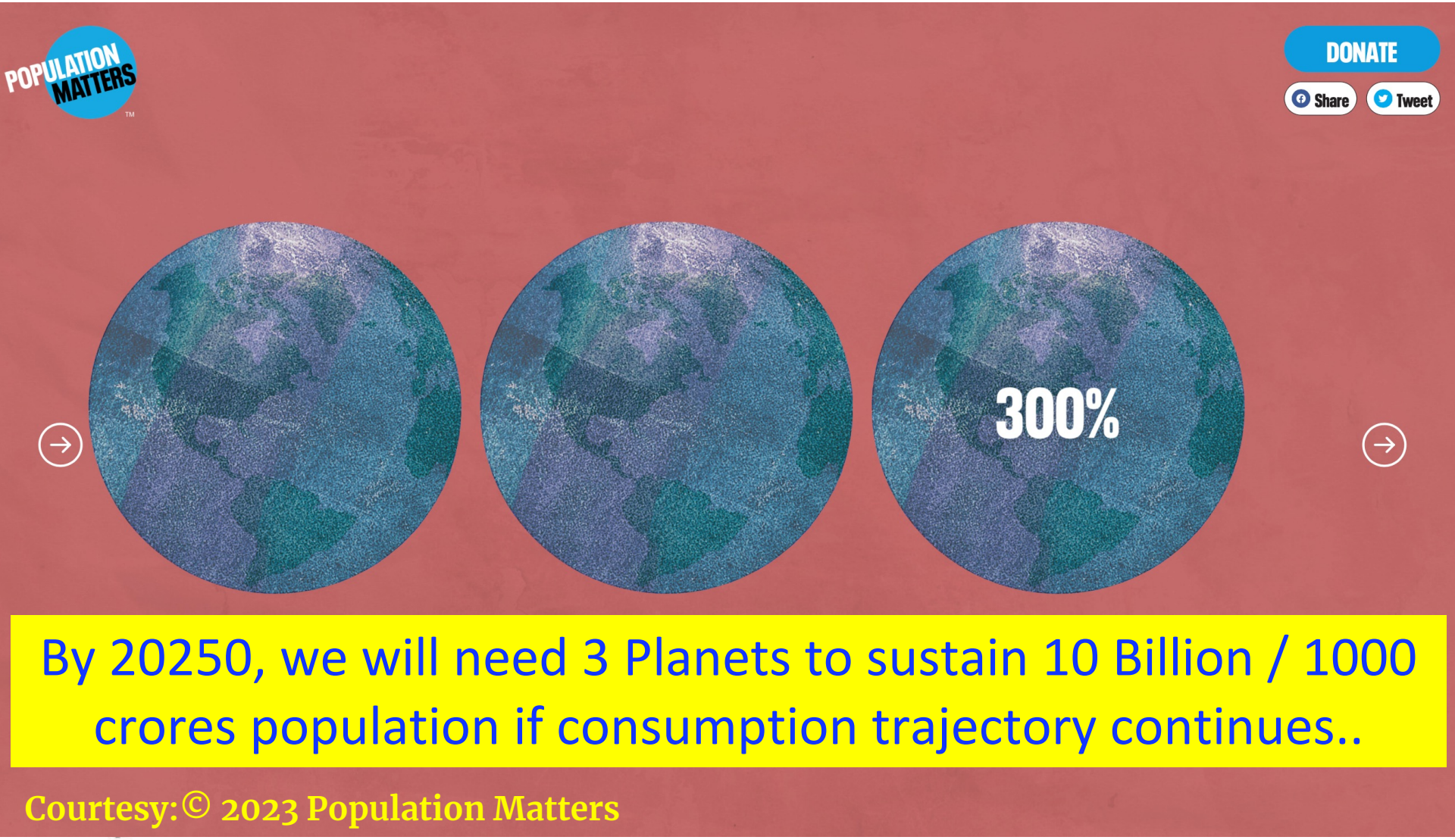
Share Tweet

Planet's natural resources are used 1.7 times than it is renewed. Means, Currently we need 2 earths to meet our demand without destroying nature further

Impact of Population Explosion?



By 20250, we will need 3 Planets to sustain 10 Billion / 1000 crores population if consumption trajectory continues..

Courtesy:© 2023 Population Matters

Impact of Population Explosion?

Environmental Crisis

- Climate Change
- Biodiversity loss
- Natural Resource depletion (water, minerals)

Task in Hand…

1. To Produce enough Protein to satisfy the demand of “Affluent world”?
2. To ensure Nutritional security of Food Insecure “Poor world” ?
3. To alleviate Protein Hunger of “Aspirational world”?
4. To produce enough protein for 800 Crores (8.0 B) of world population ?
5. & 140 Crores of Indian population ?

Target in Waiting…

1. In addition to current task in hand,
   a. 50 Crores more mouths will add over next 7 years (2030);
   b. thereafter, 150 crores of more mouths will add over next 25 years (2055).
2. To produce protein (for 8.5 & 10 B world population, 1.4 & 1.5 B Indian population) while facing& managing imminent environment crisis

Puts Poultry Production & Supply chain under pressure

Task in Hand…

Unique to Poultry..

1. Chicken is the fastest growing food animal
2. Lowest FCR (1.45 and reducing @1 or 2 points /year)
3. Easily scalable to meet demand
4. Smart people, tools & technology available
5. Breeding companies are engaged in …. to promote health, welfare, performance& efficiency
6. Producers are putting efforts to get Best Performance… therefore,

"Protein for 8 / 8.5 Billion Population is achievable"

Challenges…

1. Perennial challenges
2. Seasonal / Short term challenges
3. Emerging challenges
4. Man made challenges
5. Nature posed challenges
6. Combination of both

1. Perennial Challenges

A. Raw material volatility
B. Marketing challenges
C. Biosecurity lapses & disease
D. Pricing of poultry products – highly under priced most valueable protein
E. Some of the diseases

2. Seasonal/Short term Challenges

A. Seasonal variation in demand
B. Some diseases challenges
C. Raw material Quality issues

3. Emerging Challenges

A. Plant based meat alternatives
B. Food safety issues
C. Lab Grown meat – in USA & Singapore
D. Ethanol Production from Maize – Policy decision
E. Import of processed chicken – policy decision

4. Man made Problems

A. Over Production & Overweight birds
B. Biosecurity Lapses
C. Manpower issues
D. Improper Waste disposal
E. Pollution
F. AMR

5.Nature Posed challenges

A. Climate changes & resultant issues
B. Crop failure – raw material supply disruption

6.Man Made + Nature Posed challenges

A. Emergence of new strains
B. Animal Welfare issues

1. Perennial Challenges

A. Raw material volatility
B. Marketing challenges
C. Biosecurity lapses & disease
D. Pricing of poultry products
E. Some of the diseases

Raw material volatility

- Something liable to change rapidly & abruptly…
- Word Coined exclusively for Feed ingredients?
- Governed by
  - demand - supply,
  - Harvest yield – quantity & quality,
  - International scenario..
- Smart planning for procurement & storage - solution

1. Perennial Challenges

A. Raw material volatility
B. Marketing challenges
C. Biosecurity lapses & disease
D. Pricing of poultry products
E. Some of the diseases

Biosecurity lapses & disease

A. Break in security is the rule not continuity..
B. LPAI: Finally, authorities have consented for vaccination, we are thankful.
C. HPAI ?

90th world assembly of WOAH (OIE) 21-25 May23, Dr David Swayne “vaccination as a component of both prevention & control of HPAI”

2. Seasonal/Short term Challenges

A. Seasonal variation in demand
B. Some diseases challenges
C. Raw material Quality issues

Seasonal variation in demand

Inbuilt in our culture / Blame it on..

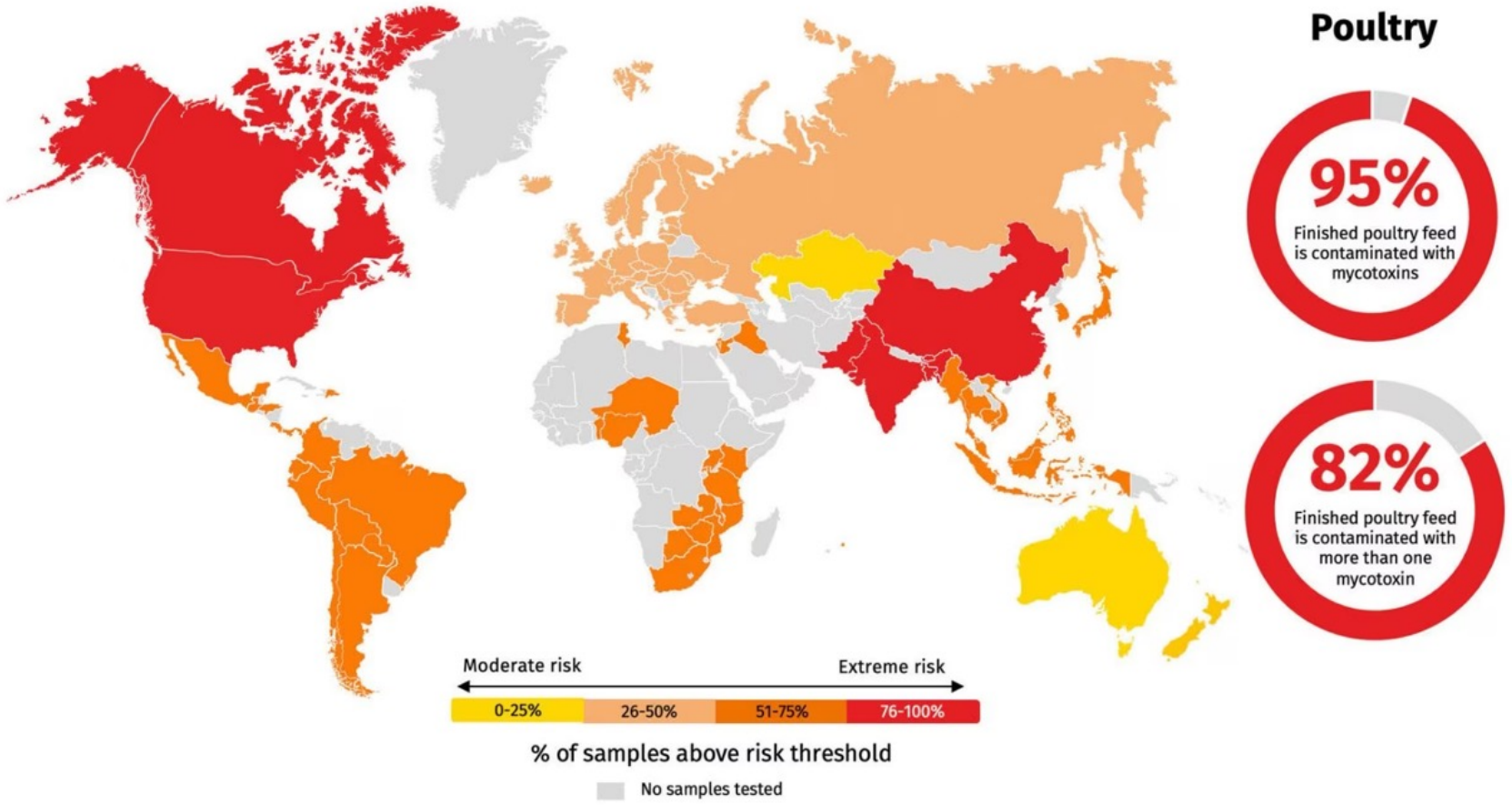
- Our customs, Traditions, Festivals..
- Individual choice
- Vegetarian season

2. Seasonal/Short term Challenges

A. Seasonal variation in demand
B. Some diseases challenges
C. Raw material Quality issues

Raw material Quality issues

- Climate change
- Untimely rain
- Poor Harvesting method (smaller land holding)
- Post harvest handling
- Storage, transportation & so on



**Courtesy: DSM

3. Emerging Challenges

A. Plant based meat alternatives
B. Lab Grown meat
C. Ethanol Production from Maize
D. Import of processed chicken
E. Food safety issues


PLANT
BASED
MEAT

MENU

Sodexo vows half of its college menus will soon be plant-based

The foodservice provider is increasing its commitment to plant-based cuisine on campus.

*By **Kelsey Nash** on Apr. 18, 2023*

THE HUMANE SOCIETY OF THE UNITED STATES

Our Fights Our Impact How You Can Help

Press Release May 16, 2023

Penn State becomes third Big Ten school to increase plant-based options on campus

In April, Penn State, in collaboration with the Humane Society of the United States, committed to providing more plant-based entrees to students and staff, becoming the third Big Ten school to do so.

Penn State plans on having 35% of its entrees be plant-based by 2025, joining the University of Michigan, which set a target of serving 55% plant-based entrees by 2025, and the University of Wisconsin-Madison, which set a plant-based target of 30% by 2025.

Plant based meat alternatives

- Not exactly plants
- But ultra processed products – concentrated or isolated plant proteins.
- Nutritional & clean label claims ??
- Doesn't taste like meat.
- So far failed to make a dent on animal protein market share.

However, if it delivers great taste & over all eating experience at a price comparable to premium meat, it can capture some market

(of course, not soon)

3. Emerging Challenges

A. Plant based meat alternatives
B. Food safety issues
C. Lab Grown meat – in USA & Singapore
D. Ethanol Production from Maize – Policy decision
E. Import of processed chicken – policy decision

Food safety issues

- Bacterial contamination/ Food borne infections
- Pesticide residues
- Antibiotic residues

Salmonella by the **Numbers**

1.35 million

The rate of *Salmonella* infections has remained consistent over the last two decades, with an estimated 1.35 million infections in the U.S. each year.

23%

It is estimated that over 23% of foodborne *Salmonella* illnesses are due to eating chicken or turkey.

50%

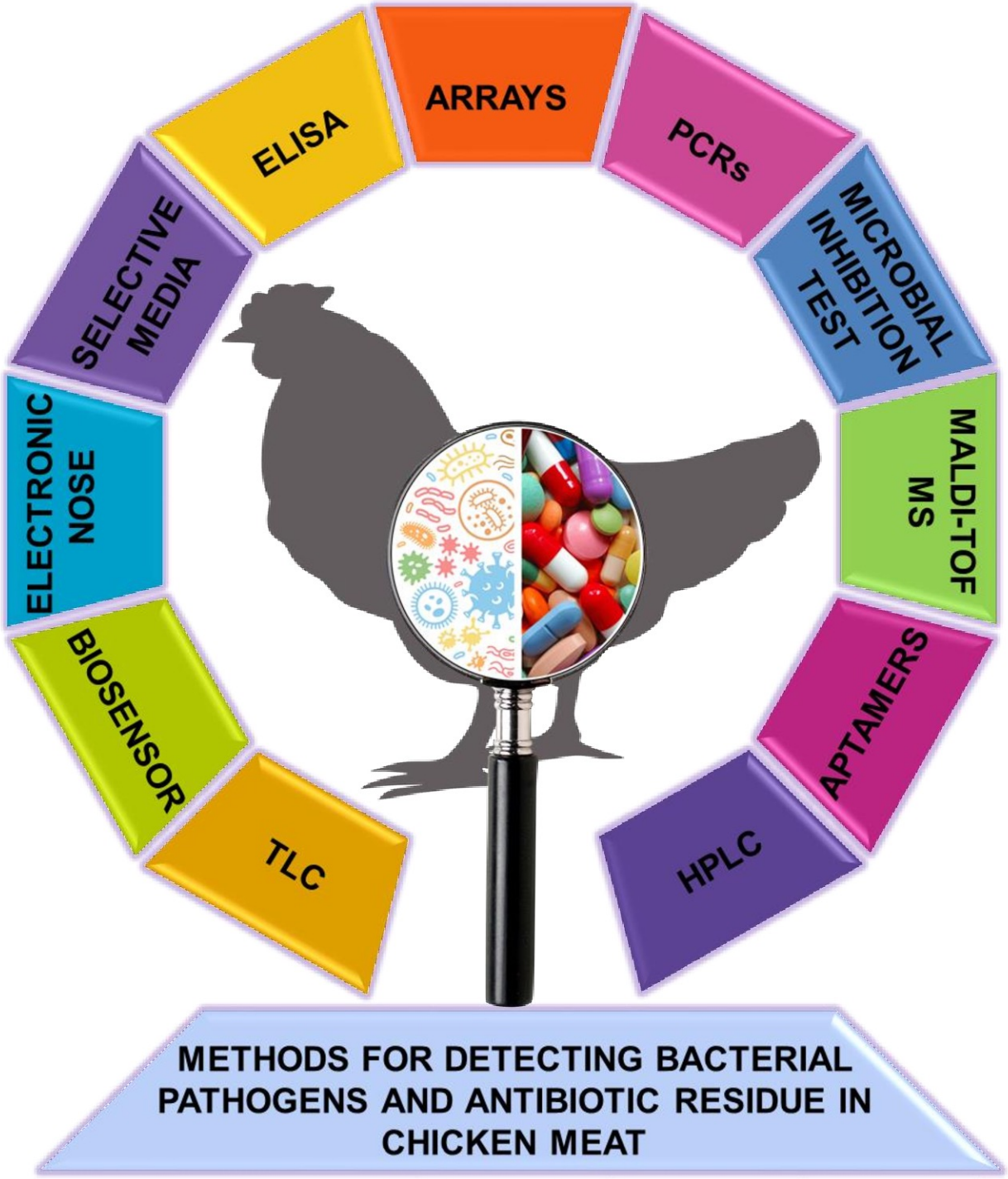
During 2017–2021, FSIS measured a 50% decrease in the proportion of chicken samples positive for *Salmonella*.

25%

FSIS needs a new approach to reach the Healthy People 2030 target of 25% reduction in *Salmonella* illnesses.

Source: USDA FSIS


Antibiotic
Occurrence
Health Risk
Agriculture
Market
Resistance
Toxicity
Allergy


ELISA
ARRAYS
PCRs
MICROBIAL INHIBITION TEST
MALDI-TOF MS
APTAMERS
HPLC
TLC
BIOSENSOR
ELECTRONIC NOSE
SELECTIVE MEDIA
METHODS FOR DETECTING BACTERIAL PATHOGENS AND ANTIBIOTIC RESIDUE IN CHICKEN MEAT

4. Man made Problems

A. Over Production & over weight birds
B. Biosecurity Lapses
C. Labour issues
D. Improper Waste disposal
E. Human Negligence
F. AMR

Over Production

Seasonal variation in demand?

- Jan – mar: Rs. 50 - 80/Apr – June:Rs.100 – 150?

Poultry Outlook

Year	DOC Placement (Cr)	Contract Farming (Cr)	% Share	Own Farming (Cr)	% Share
2019-20	38	27	71.5	11	28.5
2023-24	44	35	79.5	9	20.5

Over Production/ Overweight

Seasonal Variation in demand

- 200 grams extra body weight = 3.62 Crore more birds of 2.1 kg /month & 13 crores kg of more feed (1.3 Million tons)
- Self Discipline..
- Commitment ..
- Ambition but not greed..

4. Manmade Problems

A. Over Production
B. Biosecurity Lapses
C. Manpower issues
D. Improper Waste disposal
E. Pollution
F. AMR

Improper Waste disposal

- Major biosecurity threat
- Waste of valuable protein ingredient
- Adding to municipal waste
- Public nuisance

A massive movement is required to convince producers to invest into rendering of poultry waste

4. Manmade Problems

A. Over Production
B. Biosecurity Lapses
C. Manpower issues
D. Improper Waste disposal
E. Human Negligence
F. AMR

Manpower issues

- Professional, Skilled, Semiskilled, unskilled
- Severe Labour shortage
- Rest of the category – unattractive (salary is not the sole criterion)
- We need to attract & retain creative young talent
  - Strengthening ties with academia
  - Offering scholarships & internship
- Firsthand glimpse

Manpower issues

Generation Z

- Least or nil financial commitments
- Attachment /Loyalty?
- Work where you can make an impact
  - Cares for environment & Community
  - Love animals
  - Sustainable activity & so on

Employer's commitment to the welfare

4. Man made Problems

A. Over Production
B. Biosecurity Lapses
C. Manpower issues
D. Improper Waste disposal
E. Human Negligence
F. AMR

Anti Microbial Resistance

AMR Challenge

- We know how it develops & its consequences
- What is our Approach & efforts to MITIGATE it
- Have we stopped Subtherapeutic level use?
- How many Samples we do ABST?
- How many Prescription are guided by ABST?
- How Serious we are about it ?

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MONDAY, 28 JANUARY 2019

in US-China trade relations has started to hurt India's cotton yarn exports and there is a chance of more damage. ▶ P 7

▶ Farm Stress Busters, Tax Sops on Govt Agenda ▶ Smaller Ecomm Players Back Feb 1 Deadline ▶ CBDT Chief's Kin Faced Probe for UP Land Deals: P 1

Multidrug-resistant bacteria found in 40% of supermarket meat samples

“Superbugs” present in chicken, turkey, beef and pork, Spanish study finds

19 June 2023 4 minute read By: European Society of Clinical Microbiology and Infectious Diseases

Multidrug-resistant *E. coli* were found in 40% of supermarket meat samples tested in a Spanish study. *E. coli* strains capable of causing severe infections in people were also highly prevalent, this year's European Congress of Clinical Microbiology & Infectious Diseases (ECCMID 2023, Copenhagen, 15-18 April) heard.

Antibiotic resistance is reaching dangerously high levels around the world. Drug-resistant infections kill an estimated 700,000 people a year globally and, with the figure projected to rise to 10 million by 2050 if no action is taken, the World Health Organization (WHO) classes antibiotic resistance as one of the greatest public health threats facing humanity.

Multidrug-resistant bacteria can spread from animals to humans through the food chain but, due to commercial sensitivities, data on levels of antibiotic-resistant bugs in food is not made widely available.

To find out more, Dr Azucena Mora Gutiérrez and Dr Vanesa García Menéndez, of the University of Santiago de Compostela-Lugo, Lugo, Spain, together with colleagues from other research centres, designed a series of experiments to assess the levels of multidrug-resistant and extraintestinal pathogenic Enterobacteriaceae (*Klebsiella pneumoniae*, *E. coli* and other bacteria that can cause multidrug-resistant infections such as sepsis or urinary tract infections) in meat on sale in Spanish supermarkets.

They analysed 100 meat products (25 each of chicken, turkey, beef and pork) chosen at random from supermarkets in Oviedo during 2020.

Antibiotics in chicken

Growing antibiotic-resistance in humans also because of large-scale indiscriminate use of antibiotics in poultry industry, claims CSE study

- 70 chicken samples from Delhi-NCR region tested for six commonly used antibiotics
- 40 per cent samples test positive; residues of more than one antibiotic found in

Use of antibiotics in Food animals

Public misconception

- Use of antibiotics in food animals leads to resistant ‘Superbugs’..
- Treatment of food animals ends up in ‘antibiotic residues’

Need to work to remove that misconception

'Eating chicken is like taking a course of antibiotics'

Devi Shetty, cardiac surgeon and founder of Narayana Health, has seen increasing cases of antibiotic resistance at his hospital. Even those who had never taken antibiotics are reporting it. Edited excerpts from an interview

How does antibiotic resistance affect treatment of patients?

We are essentially going back to the pre-penicillin era. During the World Wars, soldiers used to succumb to even minor injuries

As per ‘Veterinarians’ Oath'

Poultry Veterinarian’s job

- to address health & welfare of Poultry
- while promoting responsible livestock production &
- protecting public health

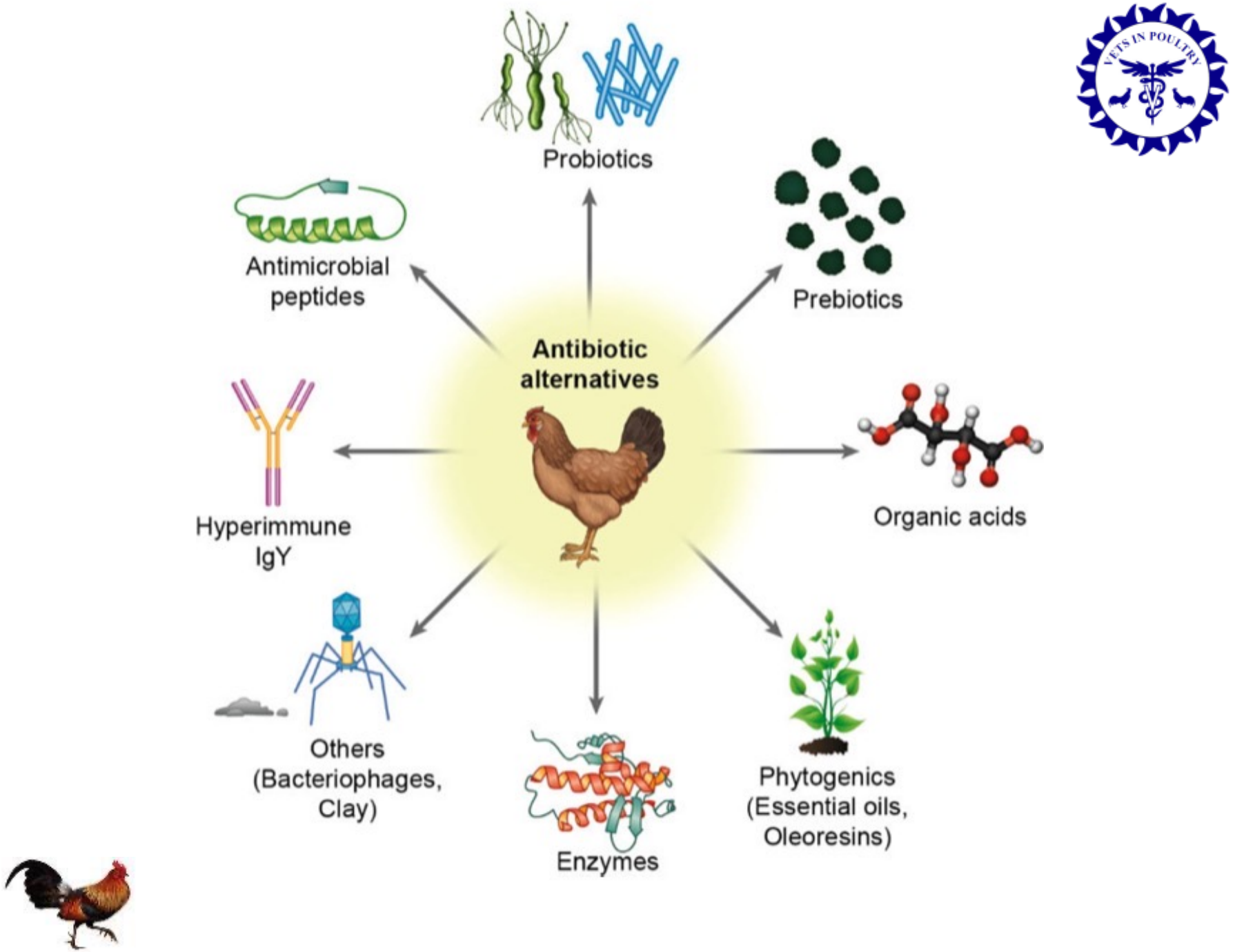
To Prevent & Alleviate suffering..

Ethical obligation & Professional responsibility..

However, ‘antibiotic stewardship’ requires us to

- Ask for non antibiotic alternatives
- Choose a suitable antibiotic
- Assure safe & effective administration

Please bring blanket ban on Import, Production, Blending, Distribution, Prescription, Dispensing & use of Medically important Antibiotics in Food Animals.. & Veterinary antibiotics should be sold on prescription in triplicate
1 copy each for writer, dispenser & user

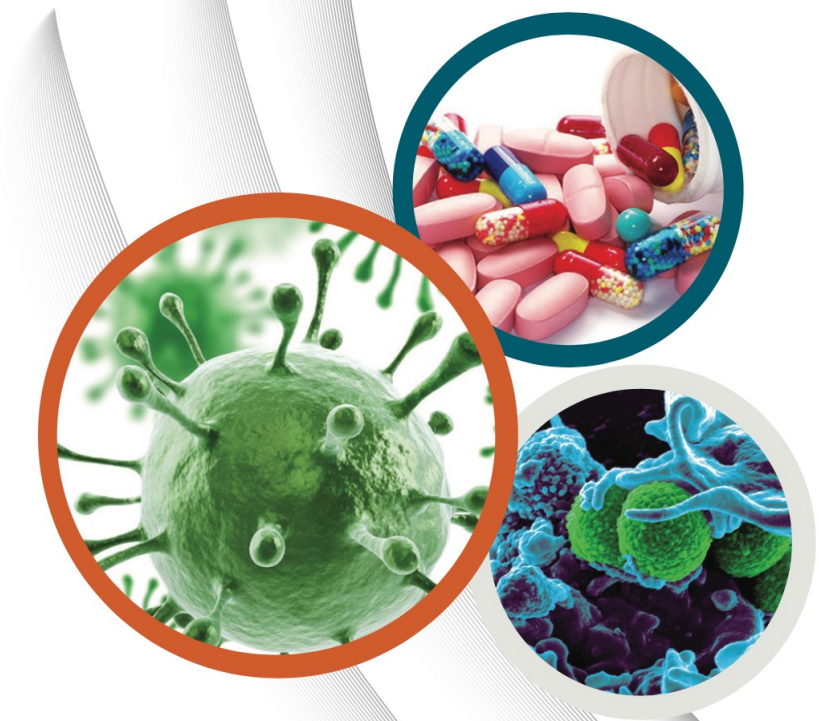

Probiotics
Antimicrobial peptides
Prebiotics
Antibiotic alternatives
Hyperimmune IgY
Organic acids
Others (Bacteriophages, Clay)
Enzymes
Phytogenics (Essential oils, Oleoresins)

AMR
Tackling Antimicrobial Resistance

सत्यमेव जयते
DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science and Technology

RESEARCH COUNCILS UK
INDIA

November 2017



Newton-Bhabha Fund

CDDEP THE CENTER FOR Disease Dynamics, Economics & Policy
WASHINGTON DC • NEW DELHI

VETS IN POULTRY

Foreword

Antimicrobial Resistance (AMR) is recognised as a complex problem and addressing it requires countries to make joint efforts across various disciplines. Considering the complex nature of the AMR problem, no individual country has the capacity to address this major public health problem independently. Accordingly, India and the United Kingdom came together to fight against AMR in November 2016 with a new £13 million UK-India research program to conduct collaborative research across multiple disciplines to come up with comprehensive and creative solutions to overcome AMR.

As the first step, the Department for Biotechnology (DBT), Government of India, in partnership with Research Councils United Kingdom (RCUK)- the strategic partnership of the UK's seven Research Councils, commissioned this study to map the AMR research landscape mapping in India. This report summarizes the current AMR situation in India with a focus on antibacterial resistance and identifies the current research gaps to determine future research priorities in India. This report should be a ready reckoner to scientists and policy makers for designing interventions to address AMR problems jointly and unequivocally.

I sincerely hope that this report encourages Indian scientists to fill evidence gaps in addressing the AMR challenge through innovations and new technologies tailored to local needs. Such innovations require effective collaboration among UK and Indian scientists across several disciplines, including medical scientists, natural scientists, sociologists, engineers and economists to name a few.

K. VijayRaghavan

Prof K VijayRaghavan

Secretary, Department of Biotechnology,
Ministry of Science and Technology,
Government of India.

Table 3.6:

Antibiotic resistance in poultry in various studies in India

Study	Year(s) of data collection and state	Specimen	Organism	Findings
Brower et al. 2017	2014 Punjab	Cloacal swab samples Broilers (n=270) Layers (n=260)	Not applicable	ESBL producing strains (%) Broilers: 87% of cloacal swabs Layers: 42% of cloacal swabs
Shrivastav et al. 2016	2015 Madhya Pradesh	Cecal swabs	*E. coli* (n=400)	ESBL producers (%) Broilers: 33.5%
Kar et al. 2015	2013–2014 Odisha	Fecal sample	*E. coli* (n=170)	ESBL producers (%) Poultry: 9.4%
Naik et al. 2015	2013–2014 Chattisgarh	Chicken meat samples (n=200)	*Salmonella* species (n=14)	Prevalence of *Salmonella*: 7% Resistance % [illegible] Erythromycin:100% Oxytetracycline: 42.8%
Kaushik et al. 2014	2010–2013 Bihar	Chicken meat samples (n=228)	*Salmonella* species (n=54)	Prevalence of *Salmonella*: 23.7% 100% resistance AmpicillinGentamicin Highly sensitive Ceftriaxone Azithromycin [illegible] Tetracycline
Samanta et al. 2014	Year not mentioned West Bengal	Cloacal samples, eggs and environment samples of backyard [illegible]	*Salmonella* species (n=22)	Prevalence of *Salmonella*: 6.1% Resistance % [illegible] Gentamicin: 100% Tetracycline:100% Ceftriaxone: 0
Singh et al. 2013	Year not mentioned Uttar Pradesh	Cloacal samples, eggs and environment samples (n=720)	*Salmonella* species (n=26)	Prevalence of *Salmonella*- 3.3% Resistance% Ampicillin: 0% [illegible] Gentamicin: 7.7% Tetracycline:23.1%

6.Man Made + Nature Posed challenges

A. Emergence of new strains
B. Animal Welfare issues

6. Man Made + Nature Posed challenges

Emergence of new strains

Vaccine resistant, more virulent strains are serious challenges with disastrous consequence

- Indiscriminate & repeated use of Live vaccines
- Unrelated vaccine strain introduction into a flock
- Faulty vaccination method & dosage (leading to sub optimal response)

Classic case is – IBV

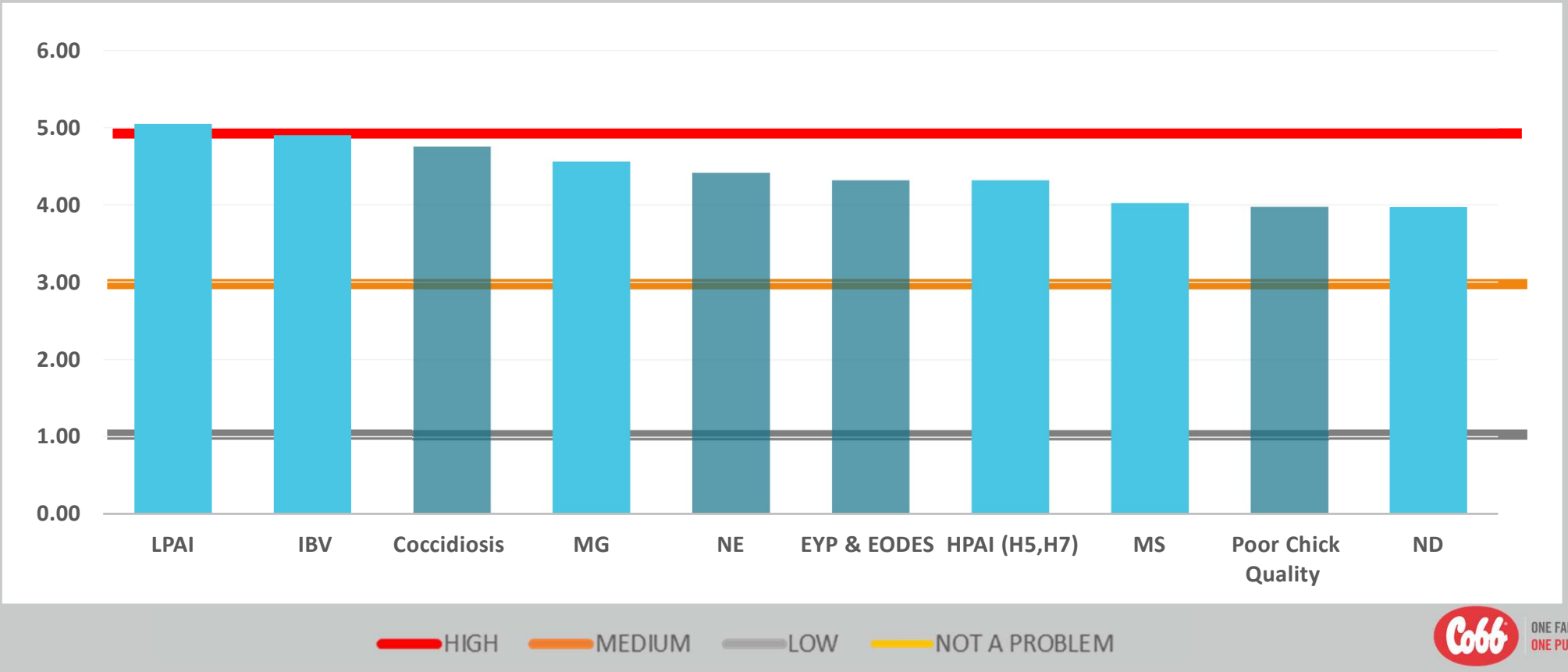
6. Man Made + Nature Posed challenges

Emergence of new strains

Classic case is – IBV Infection

- 3 – 4 different strains are introduced repeatedly in a given flock
- ILT, LPAI, ND – parallel infections complicate it
- Broiler: 8-12% depletion
- Layers & Breeders: Drop/Stagnation in production before peak & higher depletion

Asia's main concerns in BREEDERS
TOP 10 DISEASES in 2021



Cobb ONE FAMILY. ONE PURPOSE.

Emerging diseases (not graded): Participant concerns in 2021

BANGLADESH	CHINA	INDIA	INDONESIA	MALAYSIA	NEPAL	PHILIPPINES	SOUTH KOREA	SRI LANKA	THAILAND	BRUNEI	PAKISTAN
HPAI	AI (LPAI + HPAI)	ND	LPAI AND HPAI	LPAI AND HPAI	LPAI	LPAI AND HPAI	LPAI AND HPAI	Coccidiosis	LPAI AND HPAI	CELLULITIS	LPAI
LPAI	IB (variants, QX-like strains)	IB	IB	IBDV variants	ND	IB	IB	EDS	IB	IB	Chick quality
IB	IBDV variants	Coccidiosis	NE and Coccidiosis	Viral arthritis	ILT	ILT	IBDV (variants)		Non antibiotic ever	EYP	Viral arthritis
Coccidiosis	Mycotoxins			ND	CAV	ND	Salmonellosis		Salmonellosis	Coccidiosis	CAV

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6. Man Made + Nature Posed challenges

Emergence of new strains

IBV Infection – Corona virus

COVID-19 Infection– Corona virus

Many variants evolved in just 2 years, only 40 – 70% match with earlier strain, vaccine partially protects/doesn't protect,

So much discussions & deliberations by experts …

which vaccine strain, which route, which age group, when to repeat and so on..

How much precautions we took before taking vaccine…

More rational approach – next time before we decide about vaccination against IB Corona Virus ???

6.Man Made + Nature Posed challenges

A. Emergence of new strains
B. Animal Welfare issues

Animal Welfare issues

- Poultry genetics & breeding program
- Good veterinary care
- Good housing
- Good husbandry practice
- Biosecurity measures
- Bio-secure compartment

Animal Welfare issues

When Birds' welfare is taken care

- Remains stress free & in good health
- Stronger immune system
- Robust & Disease free
- Maximum productivity & Returns
- Smaller carbon footprint – 2.5 Kg bird

Bring home this point to public & consumers

Scan the QR code for
Event Location

"The greatness of a nation and its moral progress can be judged by the way its animals are treated."

- Mahatma Gandhi

पशुपालन और डेयरी विभाग
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Advertisement Efforts

Eat more chicken – good, healthy & affordable

target audience & objective ?

- Already a consumer?
- Vegetarian?
- Who became VEGAN?
- Wrong Perception of unnatural production?
- Worried about welfare, cruelty, food safety?

Cadbury Chocolate episode?

Take home message

- Self discipline & Commitment
- Responsible Producer
- Breed confidence –Consumers & Pubic & Vendors; Sense of pride – employees.
- Maintain open communication &Transparency among producers, public & authorities
- Let us come together to protect our own interests

Take home message

Let us become passionate about Breeding, Farming, Veterinary care & Poultry Business.

What should drive our – Passion?

A feeling we produce best quality, healthy, yet affordable protein in a responsible way & are proud partners in ensuring nutritional security and reducing protein hunger of this world

Thank you.....