ANTHROPOLOGY CURRENT AFFAIRS MAGAZINE JUNE 2024

VISHNUIAS.COM

WE PROVIDE A PATH FOR YOUR SUCCESS

CURRENT AFFAIRS ANTHROPOLOGY

A MAGAZINE FOR CIVIL SERVICES PREPARATION

(Welcome To Vishnu IAS online)

(Research and Training Institute for the best civil services preparation in India)

CONTENTS

PAPER -1

PHYSICAL & ARCHAEOLOGICAL ANTHROPOLOGY

SOCIO – CULTURAL ANTHROPOLOGY

PAPER - 2

INDIAN & TRIBAL ANTHROPOLOGY

1. Hakki Pikkis caught in Sudan conflict: Why this tribe of bird catchers travels to Africa from Karnataka
2. Andhra's Koya tribe faces brewing conflict over sacred Mahua flower
3. Rights ensured under FRA are not just 'enjoyment rights'
4. Wancho Tribe of Arunachal
5. Andaman's Onge Tribe
6. Unying Festival of Adi community of Arunachal Pradesh
7. NCST functioning with less than 50% of sanctioned strength
8. Involving indigenous people in environmental governance — the SixthSchedule way
9. Chenchus lured with promise of a 'good life', forest open to plunder
10. Fighting Malnutrition In Odisha's Angul, A Story That Inspires All
11. Row over adopting fathers surname in meghalaya
12. Home gardens are key to better lives for vulnerable tribes in India, finds research

PAPER - 1

PHYSICAL & ARCHAEOLOGICAL ANTHROPOLOGY

1. Scientists "Revive" Stone Age Molecules From Ancient DNA

In a highly transdisciplinary study, scientists are rebuilding microbial natural products up to 100,000 years old using dental calculus of humans and Neanderthals.

Breakthroughs in ancient genome reconstruction and biotechnology are now revealing the rich molecular secrets of Paleolithic microorganisms. In a new study published in Science, a transdisciplinary team of researchers led by the Leibniz Institute for Natural Product Research and Infection Biology, the Max Planck Institute for Evolutionary Anthropology, and Harvard University reconstructed bacterial genomes of previously unknown bacteria dating to the Pleistocene. Using their genetic blueprints, they built a biotechnology platform to revive the ancient bacteria's natural products.

Microbes are Nature's greatest chemists, and among their creations are a large number of the world's antibiotics and other therapeutic drugs. Producing these complicated chemical natural products is not straightforward, and to do so bacteria rely on specialized kinds of genes that encode enzymatic machinery capable of making such chemicals. At present, scientific study of microbial natural products is largely limited to living bacteria, but given that bacteria have inhabited the earth for more than 3 billion years, there is an enormous diversity of past natural products with therapeutic potential that remain unknown to us – until now.

"In this study, we have reached a major milestone in revealing the vast genetic and chemical diversity of our microbial past," says co-senior author Christina Warinner, Associate Professor of Anthropology at Harvard University, Group Leader at the Max Planck Institute for Evolutionary Anthropology, and Affiliate Group Leader at the Leibniz Institute of Natural Product Research and Infection Biology (Leibniz-HKI). "Our aim is to chart a path for the discovery of ancient natural products and to inform their potential future applications," adds co-senior author Pierre Stallforth, Professor of Bioorganic Chemistry and Paleobiotechnology at Friedrich Schiller University Jena and Head of the Department of Paleobiotechnology at the Leibniz

A billion-piece jigsaw puzzle

When an organism dies, its DNA rapidly degrades and fragments into a multitude of tiny pieces. Scientists can identify some of these DNA fragments by matching them to databases, but for years microbial archaeologists have struggled with the fact that most ancient DNA cannot be matched to anything known today. This problem has long vexed scientists, but recent advances in computing are now making it possible to refit the DNA fragments together – much like the pieces of a jigsaw puzzle – in order to reconstruct unknown genes and genomes. The only problem is that it does not work very well on highly degraded and extremely short ancient DNA from the Pleistocene.

"We had to completely rethink our approach," says Alexander Hübner, postdoctoral researcher at the Max Planck Institute for Evolutionary Anthropology and co-lead author of the study. Three years of testing and optimization later, Hübner says they reached a breakthrough, achieving stretches of reconstructed DNA more than 100,000 base pairs in length and the recovery of a wide range of ancient genes and genomes. "We can now start with billions of unknown ancient DNA fragments and systematically order them into long-lost bacterial genomes of the Ice Age."

Exploring the microbial Paleolithic

The team focused on reconstructing bacterial genomes encased within dental calculus, also known as tooth tartar, from 12 Neanderthals dating to ca. 102,000–40,000 years ago, 34 archaeological humans dating to ca. 30,000–150 years ago, and 18 present-day humans. Tooth tartar is the only part of the body that routinely fossilizes during the lifetime, turning living dental plaque into a graveyard of mineralized bacteria. The researchers reconstructed numerous oral bacterial species, as well as other more exotic species whose genomes had not been described before.

Among these was an unknown member of Chlorobium, whose highly damaged DNA showed the hallmarks of advanced age, and which was found in the dental calculus of seven Paleolithic humans and Neanderthals. All seven Chlorobium genomes were found to contain a biosynthetic gene cluster of unknown function. "The dental calculus of the 19,000-year-old Red Lady of El Mirón, Spain yielded a particularly well-preserved Chlorobium genome," says Anan Ibrahim, postdoctoral researcher at the Leibniz Institute of Natural Product Research and Infection Biology and co-lead author of the study. "Having discovered these enigmatic ancient genes, we wanted to take them to the lab to find out what they make".

Ice Age chemistry

The team used the tools of synthetic molecular biotechnology to allow living bacteria to produce the chemicals encoded by the ancient genes. This was the first time this approach had been successfully applied to ancient bacteria, and it resulted in the discovery of a new family of microbial natural products that the researchers named "paleofurans." "This is the first step towards accessing the hidden chemical diversity of earth's past microbes, and it adds an exciting new time dimension to natural product discovery," says Martin Klapper, postdoctoral researcher at the Leibniz Institute of Natural Product Research and Infection Biology and co-lead author of the study.

A novel collaboration to found a new field

The success of the study is the direct outcome of an ambitious collaboration between archeologists, bioinformaticians, molecular biologists, and chemists to overcome technological and disciplinary barriers and break new scientific ground. "With funding from the Werner Siemens Foundation, we set out to build bridges

between the humanities and natural sciences," says Pierre Stallforth. "By working collaboratively, we were able to develop the technologies needed to recreate molecules produced a hundred thousand years ago ," says Christina Warinner. Looking towards the future, the team hopes to use the technique to find new antibiotics.

2. 'Dragon man' skull prompts rethinking of evolution

A well-preserved cranium, colloquially known as "dragon man" from China, has made headlines worldwide and been described as one of the world's most groundbreaking, significant and exciting scientific discoveries, as global institutions review progress made in the past year.

Reportedly unearthed in 1933 when Harbin, the capital of Heilongjiang province, was under Japanese occupation, the skull was found when a bridge was being built over the Songhua River. To ensure its safekeeping, the man who found the fossil concealed it at the bottom of an abandoned well. The cranium was not brought to light again until the third generation of the anonymous man's family learned the secret before his death.

Findings that could lead to a rethinking of human evolution have been made since the skull was donated in 2018 to the Geoscience Museum of Hebei GEO University in Shijiazhuang, the capital of Hebei province. This year, an international research

team – of which Ji Qiang, a professor of paleontology at Hebei GEO University, was the leading scientist – has classified the cranium as belonging to a new species: Homo longi. They believe the fossil has provided crucial evidence for the study of the origin and evolution of Homo sapiens, the species to which all living humans belong.

The team's findings were published in the journal The Innovation in June.

According to a media release from the university that month, comprehensive phylogenetic analysis by the team found that the Harbin skull and some other East Asian archaic human fossils belong to an evolutionary clade, or natural group, having the same last ancestor as Homo sapiens.

It is widely believed that the Neanderthals formed a sister group of the Homo sapiens lineage. However, Chris Stringer, a paleoanthropologist at the Natural History Museum in London, who also was a member of the team, said, "Our analysis suggests that the Harbin cranium and some other Middle Pleistocene human fossils from China form a third East Asian lineage, which is actually closer to H.sapiens than the Neanderthals are."

CNN has listed "dragon man" as one of this year's six "most groundbreaking discoveries in human prehistory that are shaping the family tree in fascinating and unexpected ways". The skull "could represent a completely new type of human", it said. The hope is to extract DNA or other genetic material from the fossil to find out more about it, particularly whether it may represent the Denisovans, an enigmatic human population, CNN reported.

The Public Library of Science, a United States-based nonprofit, open-access science, technology and medical publisher, named the findings about the skull as one of the top seven discoveries in human evolution in 2021, saying, "The story behind the discovery of this cranium is fascinating!"

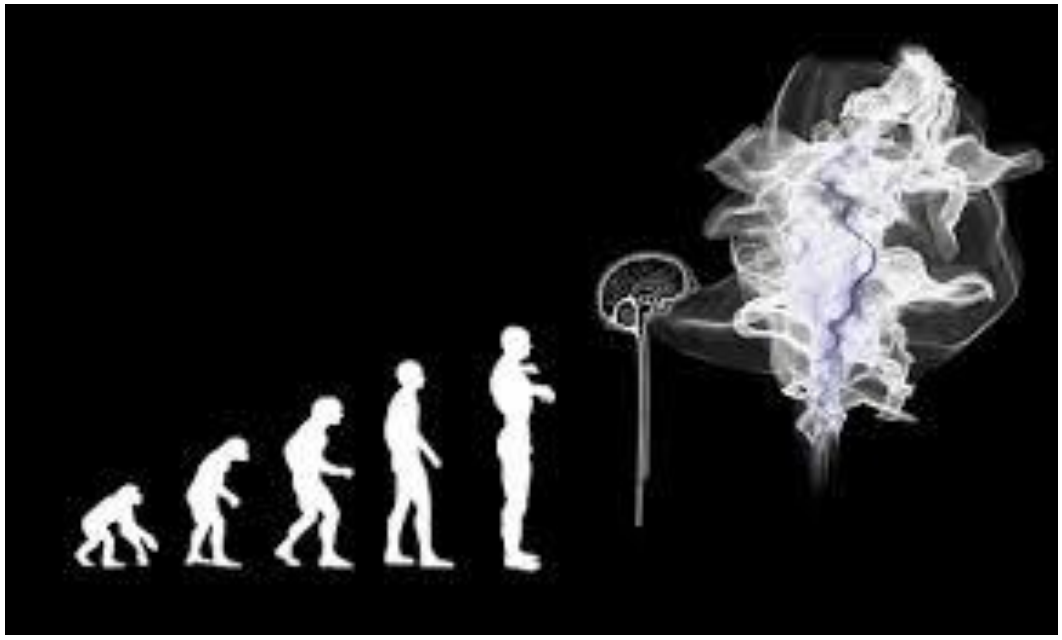
Smithsonian magazine, the official journal published by the Smithsonian Institution, a renowned US museum and research complex, has listed the "dragon man" as one of the 10 most significant science stories of 2021.

"The backstory of the skull that scientists used to suggest there was a new species of later Pleistocene human – to join Homo sapiens and Neanderthals – garnered a lot of ink," the magazine said.

It also said, however, that debate over whether the discovery of the "dragon man" warranted designation as a new species will likely continue until more fossils are discovered that help to fill in the gaps in the history of human evolution.

Ji, the lead scientist of the "dragon man" research team, said he hopes for more discoveries. At a news conference held after the publication of his team's studies, Ji said that although the number of human species became fewer, the populations became larger and larger. As a result, only one human species lives today. "I am looking forward to hunting for new human fossils, especially the common ancestor of Homo longi and Homo sapiens in East Asia, and even more in China, so as to promote international research on the origin of Homo sapiens," he said.

3. What fossils and DNA tell us about the evolution of modern intelligence



When did something like us first appear on the planet? It turns out there's remarkably little agreement on this question. Fossils and DNA suggest people looking like us, anatomically modern *Homo sapiens*, evolved around 300,000 years ago. Surprisingly, archaeology – tools, artefacts, cave art – suggest that complex technology and cultures, "behavioural modernity", evolved more recently: 50,000-65,000 years ago.

Some scientists interpret this as suggesting the earliest *Homo sapiens* weren't entirely modern. Yet the different data tracks different things. Skulls and genes tell

us about brains, artefacts about culture. Our brains probably became modern before our cultures.

Key physical and cultural milestones in modern human evolution, including genetic divergence of ethnic groups. Nick Longrich, Author provided

The "great leap"

For 200,000-300,000 years after *Homo sapiens* first appeared, tools and artefacts remained surprisingly simple, little better than Neanderthal technology, and simpler than those of modern hunter-gatherers such as certain indigenous Americans. Starting about 65,000 to 50,000 years ago, more advanced technology started appearing: complex projectile weapons such as bows and spear-throwers, fishhooks, ceramics, sewing needles.

People made representational art – cave paintings of horses, ivory goddesses, lion-headed idols, showing artistic flair and imagination. A bird-bone flute hints at music. Meanwhile, arrival of humans in Australia 65,000 years ago shows we'd mastered seafaring.

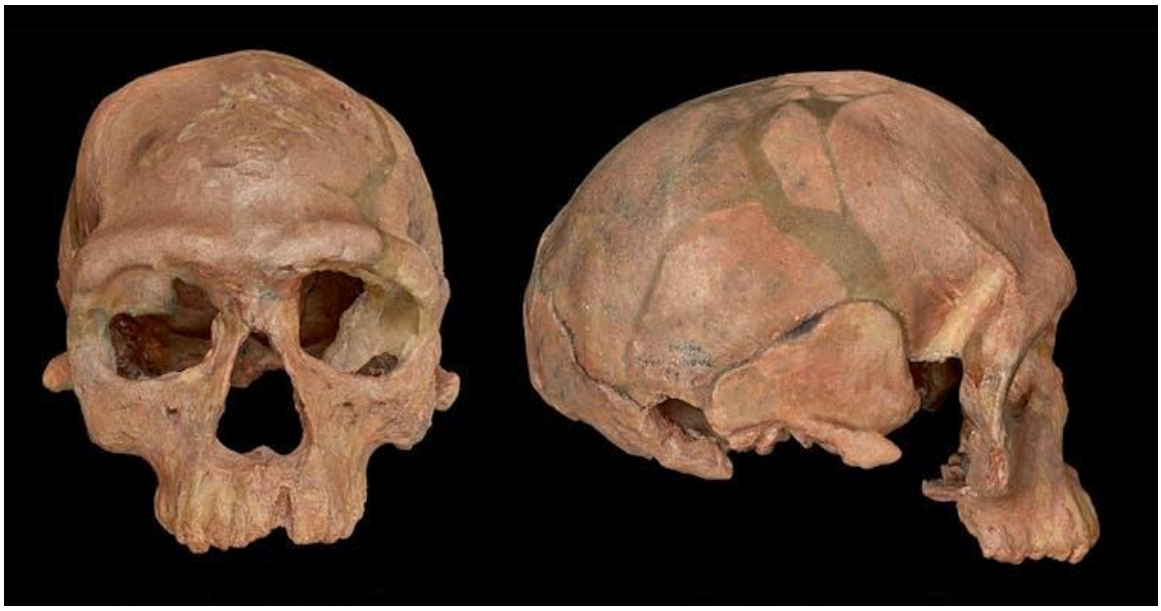
The Venus of Brassempouy, 25,000 years old. Wikipedia

This sudden flourishing of technology is called the "great leap forward", supposedly reflecting the evolution of a fully modern human brain. But fossils and DNA suggest that human intelligence became modern far earlier.

Anatomical modernity

Bones of primitive *Homo sapiens* first appear 300,000 years ago in Africa, with brains as large or larger than ours. They're followed by anatomically modern *Homo sapiens* at least 200,000 years ago, and brain shape became essentially modern by at least 100,000 years ago. At this point, humans had braincases similar in size and shape to ours.

Assuming the brain was as modern as the box that held it, our African ancestors theoretically could have discovered relativity, built space telescopes, written novels and love songs. Their bones say they were just as human as we are.



Because the fossil record is so patchy, fossils provide only minimum dates. Human DNA suggests even earlier origins for modernity. Comparing genetic differences between DNA in modern people and ancient Africans, it's estimated that our ancestors lived 260,000 to 350,000 years ago. All living humans descend from those people, suggesting that we inherited the fundamental commonalities of our species, our humanity, from them.

All their descendants – Bantu, Berber, Aztec, Aboriginal, Tamil, San, Han, Maori, Inuit, Irish – share certain peculiar behaviours absent in other great apes. All human cultures form long-term pair bonds between men and women to care for children. We sing and dance. We make art. We preen our hair, adorn our bodies with ornaments, tattoos and makeup.

We craft shelters. We wield fire and complex tools. We form large, multigenerational social groups with dozens to thousands of people. We cooperate to wage war and help each other. We teach, tell stories, trade. We have morals, laws. We contemplate the stars, our place in the cosmos, life's meaning, what follows death.

The details of our tools, fashions, families, morals and mythologies vary from tribe to tribe and culture to culture, but all living humans show these behaviours. That suggests these behaviours – or at least, the capacity for them – are innate. These shared behaviours unite all people. They're the human condition, what it means to be human, and they result from shared ancestry.

We inherited our humanity from peoples in southern Africa 300,000 years ago. The alternative – that everyone, everywhere coincidentally became fully human in the same way at the same time, starting 65,000 years ago – isn't impossible, but a single origin is more likely.

The network effect

Archaeology and biology may seem to disagree, but they actually tell different parts of the human story. Bones and DNA tell us about brain evolution, our hardware. Tools reflect brainpower, but also culture, our hardware and software.

Just as you can upgrade your old computer's operating system, culture can evolve even if intelligence doesn't. Humans in ancient times lacked smartphones and spaceflight, but we know from studying philosophers such as Buddha and Aristotle that they were just as clever. Our brains didn't change, our culture did.

Middle Stone Age technology.

That creates a puzzle. If Pleistocene hunter-gatherers were as smart as us, why did culture remain so primitive for so long? Why did we need hundreds of millennia to invent bows, sewing needles, boats? And what changed? Probably several things.

First, we journeyed out of Africa, occupying more of the planet. There were then simply more humans to invent, increasing the odds of a prehistoric Steve Jobs or

Leonardo da Vinci. We also faced new environments in the Middle East, the Arctic, India, Indonesia, with unique climates, foods and dangers, including other human species. Survival demanded innovation.

Many of these new lands were far more habitable than the Kalahari or the Congo. Climates were milder, but *Homo sapiens* also left behind African diseases and parasites. That let tribes grow larger, and larger tribes meant more heads to innovate and remember ideas, more manpower, and better ability to specialise. Population drove innovation.

This triggered feedback cycles. As new technologies appeared and spread – better weapons, clothing, shelters – human numbers could increase further, accelerating cultural evolution again.

Numbers drove culture, culture increased numbers, accelerating cultural evolution, on and on, ultimately pushing human populations to outstrip their ecosystems, devastating the megafauna and forcing the evolution of farming. Finally, agriculture caused an explosive population increase, culminating in civilisations of millions of people. Now, cultural evolution kicked into hyperdrive.

Artefacts reflect culture, and cultural complexity is an emergent property. That is, it's not just individual-level intelligence that makes cultures sophisticated, but interactions between individuals in groups, and between groups. Like networking millions of processors to make a supercomputer, we increased cultural complexity by increasing the number of people and the links between them.

So our societies and world evolved rapidly in the past 300,000 years, while our brains evolved slowly. We expanded our numbers to almost 8 billion, spread across the globe, reshaped the planet. We did it not by adapting our brains but by changing our cultures. And much of the difference between our ancient, simple hunter-gatherer societies and modern societies just reflects the fact that there are lots more of us and more connections between us.

4. Back to the time of the first Homo Sapiens with a futuristic clock, the new Radiocarbon 3.0

It is called **Radiocarbon 3.0**: it is **the newest method developments in radiocarbon dating**, and promises to reveal **valuable new insights about key events in the earliest human history**, starting with the interaction between *Homo Sapiens* and Neanderthals in Europe. This is shown by the combination of updated radiocarbon pretreatment, the latest AMS instrumental advances, and the application of the Bayesian model coupled with the new IntCal20, including the Kauri floating tree-ring section.

These important findings – published in the journal *PLOS ONE* – are the result of extensive research work, coordinated by Professor **Sahra Talamo**, director of the BRAVHO Radiocarbon Laboratory at the **University of Bologna**. Two international radiocarbon experts from the University of Heidelberg (Germany) and ETH Zurich (Switzerland) collaborated to the research as well as the isotope expert at Simon Fraser University (Canada).

The new publication presents an advanced evaluation and discussion of two earlier, widely recognized publications (Hublin et al. Nature 2020; Fewlass et al. Nature Eco&Evo 2020), focused on the earliest *Homo Sapiens* in Europe and their temporal relationship with Neanderthals. **The crucial challenge is high temporal resolution chronology**, which so far was severely limited by the low number of dates per site, low resolution of the Radiocarbon calibration curve, and limited Bayesian modelling.

In this new publication, **these central aspects are addressed in a new, fully integrated way**: (1) Only dates of samples pretreated in the state-of-the-art methodology are considered, (2) the most recent advances in the AMS Radiocarbon measurement technique are applied, and (3) Radiocarbon calibration is now based on a section of high-resolution Glacial tree-ring chronologies in the age range of 44,000 and 41,000 calendar years BP (Before 1950 AD).

The concise amalgamation of these three aspects, called **Radiocarbon 3.0**, leads to a new level of temporal interrelation between *Homo Sapiens* **at the site of Bacho Kiro, Bulgaria**, and, for the first time, **a link between the respective presence of modern humans to climatic events (warm and cold phases) in the Glacial**, documented in Greenland ice cores.

"Using Radiocarbon 3.0, we were able to reconstruct more accurately the movements of ancient hominids, which occurred at major European archaeological sites, during different climatic phases," says **Sahra Talamo**, professor at the University of Bologna's Department of Chemistry "Giacomo Ciamician" and first author of the study. "Thanks to this kind of analyses, it is therefore possible to obtain new valuable information on the evolution of the earliest human settlements and the resilience of hominids in different climatic phases, all of which may have contributed to the global spread of *Homo Sapiens*."

Radiocarbon is the most widely applied dating method in archaeology, especially in studies of human evolution. In recent decades, it has enabled scholars around the world to make **important advances in reconstructing the chronology of key events in our history**. However, this method – based on the detection of a radioactive isotope of carbon, Carbon-14, in the organic samples studied – **does not always allow us to obtain sufficiently precise and accurate dates** to fully understand the important processes of human evolution, e.g., the interaction between Neanderthals and Homo Sapiens. The challenge was therefore **to expand the capabilities of radiocarbon**, increasing its high temporal resolution chronology.

Two new Bayesian models were constructed, **using the direct dates of *Homo Sapiens* at Bacho Kiro, and Neanderthal dates of Vindija, Croatia, and Fonds-de-Foret, Belgium**. Only the high-precision dates of Bach Kiro allow to assign the presence of *Homo Sapiens* at this site during the cold phase of GS 12 (Fig. 2 in the paper).

"In this study, we have shown that the **human occupation at Bacho Kiro did not occur at once**, but there were three different occupations (one around 44,650 to 44,430, one at 44,200 to 43,420 and one at 43110 to 42700 cal BP) or two different one (one around 44,650 to 44,430, one at 44,310 to 43,710 cal BP), depending on the 14C dates considered and the Bayesian model used," explains **Talamo**.

At present, **both scenarios could be supported** because it is not yet known whether the Initial Upper Paleolithic may have lasted longer in Bacho Kiro than in the Levant or may have overlapped temporally with the Protoaurignacian dispersal.

"Moreover, obtaining a small 14C error in a time period around 42,000 years ago is a key point of radiocarbon 3.0," explains **Lukas Wacker**, at the ETH Zurich and co-author of the paper. "The better this error interval is defined and obtained, the more accurate the final age calibration process will be".

"In this paper, we have demonstrated the potential and advantages, both in terms of temporal and environmental accuracy, of discussing chronologies obtained from 14C ages with the same tight error intervals," says **Bernd Kromer** at the University of Heidelberg (Germany) and co-author of the paper. "In addition, the extent of the Initial Upper Paleolithic (IUP) is constrained better by the new models, compared to the previous publications"

"Our exercise shows that using radiocarbon 3.0 we are able to accomplish the definitive high resolution of European key archaeological sites during recurrent climate fluctuations, and model the human and faunal species' responses from a diachronic perspective," explains **Michael Richards** at Simon Fraser University (Canada) and co-author of the paper. "This is the way to promote knowledge exchange between archaeology, palaeoclimatology, geochronology, and geosciences in general, all essential disciplines in the study of the human past."

The study was published in the journal *PLOS ONE* under the title "Back to the future: the advantage of studying key events in human evolution using a new high-resolution radiocarbon method." It was carried out by an international research team, led by Prof. **Sahra Talamo** (University of Bologna), including **Bernd Kromer** (University of Heidelberg, Germany), **Michael P. Richards** (Simon Fraser University, Canada) and **Lukas Wacker** (ETH Zurich, Switzerland).

5. More Humans Are Growing an Extra Artery in Our Arms, Showing We're Still Evolving

Picturing how our species might appear in the far future often invites wild speculation over stand-out features such as height, brain size, and skin complexion. Yet subtle shifts in our anatomy today demonstrate how unpredictable evolution can be. Take something as mundane as an extra blood vessel in our arms, which going by current trends could be common place within just a few generations.Researchers from Flinders University and the University of Adelaide in Australia have noticed an artery that temporarily runs down the centre of our forearms while we're still in the womb isn't vanishing as often as it used to.

That means there are more adults than ever running around with what amounts to be an extra channel of vascular tissue flowing under their wrist. "Since the 18th century, anatomists have been studying the prevalence of this artery in adults and our study shows it's clearly increasing," says Flinders University anatomist Teghan Lucas."The prevalence was around 10 percent in people born in the mid-1880s compared to 30 percent in those born in the late 20th century, so that's a significant increase in a fairly short period of time, when it comes to evolution."

The median artery forms fairly early in development in all humans, transporting blood down the centre of our arms to feed our growing hands.At around 8 weeks, it usually regresses, leaving the task to two other vessels – the radial (which we can feel when we take a person's pulse) and the ulnar arteries.Anatomists have known for some time that this withering away of the median artery isn't a guarantee.

In some cases, it hangs around for another month or so.Sometimes we're born with it still pumping away, feeding either just the forearm, or in some cases the hand as well. To compare the prevalence of this persistent blood channel, Lucas and colleagues Maciej Henneberg and Jaliya Kumaratilake from the

University of Adelaide examined 80 limbs from cadavers, all donated by Australians of European descent.The donors raged from 51 to 101 on passing, which means they were nearly all born in the first half of the 20th century.Noting down how often they found a chunky median artery capable of carrying a good supply of blood, they compared the figures with records dug out of a literature search, taking into account tallies that could over-represent the vessel's appearance.

The fact the artery seems to be three times as common in adults today as it was more than a century ago is a startling find that suggests natural selection is favouring those who hold onto this extra bit of bloody supply. "This increase could have resulted from mutations of genes involved in median artery development or health problems in mothers during pregnancy, or both actually," says Lucas. We might imagine having a persistent median artery could give dextrous fingers or strong forearms a dependable boost of blood long after we're born. Yet having one also puts us at a greater risk of carpal tunnel syndrome, an uncomfortable condition that makes us less able to use our hands. Nailing down the kinds of factors that play a major role in the processes selecting for a persistent median artery will require a lot more sleuthing.

Whatever they might be, it's likely we'll continue to see more of these vessels in coming years. "If this trend continues, a majority of people will have median artery of the forearm by 2100," says Lucas. This rapid rise of the median artery in adults isn't unlike the reappearance of a knee bone called the fabella, which is also three times more common today than it was a century ago. As small as these differences are, tiny microevolutionary changes add up to large-scale variations that come to define a species. Together they create new pressures themselves, putting us on new paths of health and disease that right now we might find hard to imagine today.

6. Genetics Steps In to Help Tell the Story of Human Origins Africa's sparse fossil record alone cannot reveal our species' evolutionary history.

It's not unusual for geochronologist Rainer Grün to bring human bones back with him when he returns home to Australia from excursions in Europe or Asia. Jawbones from extinct hominins in Indonesia, Neanderthal teeth from Israel, and ancient human finger bones unearthed in Saudi Arabia have all at one point spent time in his lab at Australian National University before being returned home. Grün specializes in developing methods to discern the age of such specimens. In 2016, he carried with him a particularly precious piece of cargo: a tiny sliver of fossilized bone covered in bubble wrap inside a box.

The bone fragment had come from a skull—still stored at the Natural History Museum in London—with a heavy brow ridge and a large face. It looked so primitive that the miner who had discovered it in 1921 at a lead mine in the Zambian town of Kabwe, then in the British territory of Rhodesia, first thought it had belonged to a gorilla. But later that year, museum paleontologist Arthur Smith Woodward noticed what he interpreted as typically human features, such as the skull's thin and relatively large braincase, that motivated him to designate the specimen as its own hominin species.

In the 1980s, however, museum paleoanthropologist Chris Stringer took another look at the skull and classified it as belonging to the species Homo heidelbergensis, an ancient hominin thought to be a human ancestor. Based on its primitiveness, Stringer says, most researchers guessed it was an early individual who lived

around half a million years ago, some 200,000 years before the earliest Homo sapiens were starting to emerge. But nobody knew exactly how old the skull was. For decades, no dating method existed that could identify the fossil's age without the destructive process of grinding up bits of bone for analysis. But Grün was determined to find a solution. Grün is one of very few geochronologists proficient in a laser technique that extracts and reduces a barely visible grain of bone—smaller than the bone's natural pores—to atoms, he says. The laser is coupled with a mass spectrometer, which measures the concentrations of uranium isotopes that undergo radioactive decay at a specific rate over time. Having returned from his trip to procure the Homo heidelbergensis sample, Grün watched as the laser poked two tiny holes into the bone fragment and the particles disappeared into the mass spectrometer.

Upon evaluating the mass spec data, he could tell that the fragment was much younger than previously believed. As he, Stringer, and others reported in Nature this past April, their best estimate was 299,000 years, give or take 25,000. That meant that the Kabwe individual had lived not before, but around the same time as the first Homo sapiens–like people dwelled in North Africa. Along with other archaeological evidence, the findings suggest that perhaps Homo heidelbergensis was not our ancestor, but a neighbor. Together with yet another hominin, Homo naledi, known to have existed in southern Africa at that time, Africa may have been a crowded place. "Ten years ago, I think most of us would've thought, well, Africa in the last 300,000 years is just going to show you the evolution of Homo sapiens, and that's really all—the other species would have disappeared, gone extinct," notes Stringer.

"Now we know that there were probably at least three different kinds of hominins around." That's akin to the situation that unfolded in Eurasia, where Neanderthals and Denisovans thrived for hundreds of thousands of years before Homo sapiens migrated out of Africa and at times even interbred with the other hominin groups. The story in Africa remains murky, however, as researchers have not been able to reconstruct human history in vivid detail, in part because hominin fossils informative about our species' emergence and coexistence with other species are rare in Africa. As a result, finds such as the Kabwe skull continue to raise more questions than answers. If Homo heidelbergensis wasn't one of our recent ancestors, then who was? If our species really did overlap in time with Homo heidelbergensis, what role did they play in our evolutionary history? In recent years, a field that has traditionally relied on fossil discoveries has acquired helpful new tools: genomics and ancient DNA techniques.

Armed with this combination of approaches, researchers have begun to excavate our species' early evolution, hinting at a far more complex past than was previously appreciated—one rich in diversity, migration, and possibly even interbreeding with other hominin species in Africa. "To piece together that story, we need information from multiple different fields of study," remarks Eleanor Scerri, an archaeologist at the Max Planck Institute for the Science of Human History in Jena, Germany. "No single one is really going to have all the answers—not genetics, not archaeology, not the fossils, because all of these areas have challenges and limitations." A sparse fossil record Bones easily disintegrate in many parts of Africa, in acidic forest soils or dry, sun-exposed areas. Moreover, the continent is largely unexplored by archaeologists. While northwestern Africa and former British territories in eastern and southern

Africa have a long tradition of professional archaeological research, few researchers have looked for fossils anywhere else, notes archaeologist Khady Niang of Cheikh Anta Diop University in Senegal. That's especially the case for the western and central parts of the continent, where preservation conditions are also poor and excavations difficult at times due to political instability. "We might be missing some really, really important parts of the story," adds Yale University anthropologist Jessica Thompson. What African hominin fossils do make clear is the depth of humanity's roots on that continent. Researchers have found some of the most abundant fossils in sediments between 3.5 million and 3.2 million years old. That appeared to be the heyday of the australopiths (including the genus Australopithecus), apes that walked upright and are believed to have used stone tools, but still climbed trees and had relatively small brains. It's thought that somehow our own genus, Homo, emerged from transitional ape species some 2.8 million years ago as a clan of hominins with distinctive teeth, probably adapted to an eclectic diet that allowed them to thrive in a wide range of habitats. But there are few sediments, let alone fossils, left behind from that time, making the birth of our genus one of the most poorly understood periods in our evolution, Thompson notes.

The fossil record yields more secrets about the time shortly after the emergence of Homo, revealing a diversity of different Homo species in Africa, of which Homo erectus seems to persist the longest. Homo erectus crops up in Africa's limited fossil record around 2 million years ago and hangs around on the continent until roughly a million years ago. It was the first hominin that shows evidence of having lived in human-like social groupings and used fire, and it is thought to be a human

ancestor. When and how Homo sapiens emerged isn't at all clear, but what is apparent is that we weren't alone; fossils suggest that several other hominin species, such as that represented by the Kabwe skull, inhabited the conti suggest that several other hominin species, such as that represented by the Kabwe skull, inhabited the continent at the time our species appeared.

Another relatively small-brained hominin, Homo naledi, is also thought to have lived in southern Africa around 300,000 years ago. And inside a Moroccan cave called Jebel Irhoud, 300,000-year-old skeletons were found that carry very early features of Homo sapiens. It's not yet known how long those different hominin species existed, however, or whether they physically overlapped and perhaps even shared genes with one another, Stringer notes, or whether there were others. By around 160,000 years ago, the constellation of physical features that defines us today—such as a globular braincase and a pointed chin—had begun to emerge in ancient hominin groups represented by fossils found across Africa. Later, some of these anatomically modern humans crossed the thin spit of land that connects Africa to Eurasia, probably on several occasions.

On that new continent, they eventually met Neanderthals and Denisovans, which, like two hobbit-size Homo species found on southeast Asian islands, are thought to be the evolutionary products of earlier hominin migrations out of the continent. "Africa was this sort of leaky faucet, and hominins were just dribbling out of it all the time," Thompson says. Fossil finds over the years have steadily bolstered a long-held idea that anatomically modern humans first emerged in Africa. This "Out of Africa" model, proposed by anthropologists in the late 20th century, posited that all humans of Eurasian ancestry descended from a single ancestral African population, which then spread throughout the world and displaced all other hominins.

The opposing "multi-regionalism" model, by contrast, conceived that multiple human subpopulations—which stemmed from regional lineages of an ancestral species such as Homo erectus—existed across Europe, Asia, and Africa, and through continuous mixing evolved together to form the present human population. While fossils supported the former theory, it was the advent of genetic research that showed unequivocally that populations outside of Africa descended from a single population in Africa. But the story had a twist: in two groundbreaking studies published in 2014, researchers compared ancient DNA extracted from Neanderthal bones and compared it with modern-day people, and found that 2 percent of the average European genome is Neanderthal in origin. Our

species originated in Africa, but interbred with hominins outside of it.

These findings, and many since, have highlighted the power of genetics in resolving questions about human ancestry that fossils alone cannot. Investigations of the genomes of living Africans are now underway to help fill in the gaps of Africa's fossil record. "[Such studies] are really providing important insights into our population history and African origins," says Yale University evolutionary biologist Serena Tucci. "We are getting to know and understand processes that happened very early on in our evolutionary history."

7. Anthropologists compare composite measure of physiological dysregulation to understand how we age

It is well understood that mortality rates increase with age. Whether you live in Tokyo, rural Tennessee or the forests of Papua, New Guinea, the older you are, the more likely you are to succumb to any number of different ailments. But how, exactly, do our bodies weather with age, and to what extent do people around the word experience physiological aging differently?

In a paper published in a special issue of the journal Philosophical Transactions of the Royal Society B, a team of anthropologists that includes Michael Gurven, a professor of anthropology at UC Santa Barbara and chair of the campus's Integrative Anthropological Sciences Unit, and Thomas Kraft, a postdoctoral researcher in the same department, construct and compare a composite measure of "physiological dysregulation" among human populations and other species. The themed issue explores the evolution of aging among primates. Physiological dysregulation refers to the wearing down of the body's ability to bounce back from stress, damage or other adversity.

Examples include how one's body might gradually become less able to properly regulate blood sugar, or it might more likely mount an inappropriate immune response that doesn't dissipate when the threat is gone (thereby damaging the body's own cells). This decline in resilience is often considered fundamental to aging. "We're only now able to start piecing together what physiological aging looks like holistically in subsistence populations of foragers and farmers," said Kraft, the paper's lead author. "We first built a comprehensive metric of physiological dysregulation in humans, then compared it to other primates. It's not

just the case that adult mortality rates are lower in humans; rates of physiological dysregulation are much slower in humans, too." For nearly two decades, the Tsimane Health and Life History Project has been collecting a large number of measures of health and aging (referred to as biomarkers) among the Tsimane, an indigenous population of forager-horticulturists in the Bolivian Amazon.

These range from the typical measures that might be taken during a regular physical exam—blood pressure, cholesterol and blood glucose level—to indicators such as grip strength, various immune markers for inflammation and bone mineral density. Overall, the current study includes 40 biomarkers among 5,658 adults spread across 22,115 observations.

"This makes it one of the only comprehensive longitudinal studies of health in a population living a vastly different lifestyle than the urban, industrialized countries, where most studies occur," said Kraft. "While any single biomarker gives a snapshot of just one small part of health, what we did was to combine information from many biomarkers simultaneously—both the levels of these markers and the extent to which they are linked together —into a single metric," he continued.

"This summary metric gives a holistic portrait of one's 'biological age,' by measuring how 'strange' one's combined biomarkers are relative to a healthy subset of the population." Noted Gurven, co-director of the Tsimane Health and Life History Project, "In the U.S. and many other countries today, we're more likely to die of heart disease, cancer, diabetes and other 'chronic diseases of aging.' But among the Tsimane and other populations living similar lifestyles, these chronic diseases are rare. Does physiological dysregulation occur at the same rate in this very different context?"

To answer this question, the team compared Tsimane with other human populations. "Where adult mortality rates are high, we might expect that aging of our bodies occurs more quickly, tracking closely the higher increase in mortality with age," Gurven explained. "Another possibility—and a goal for many of us—is to maintain healthy bodies for as long as we can, and then have everything fall apart close to the eventual timing of our demise." The researchers found that despite a lifestyle vastly different from that of urban, post-industrialized populations such as those in the United States and Italy, and despite higher mortality rates throughout adulthood, Tsimane adults show only marginally higher rates of increase in physiological dysregulation among the Tsimane. "Our first glimpse suggests a broad species-typical pattern of physical aging across

environments and cultures," said Gurven. "That's a little surprising because the Tsimane have very low levels of late-age chronic diseases.

But the Tsimane are exposed to harsher conditions, including strenuous labor tending fields, tropical diseases and minimal access to health care." Added Kraft, "We also found similarities in physiological dysregulation among Tsimane women and men, despite evidence in many populations showing that men typically age faster and are more likely to die than women at most ages." As Gurven noted, it's impossible to understand dysregulation and aging without knowing how different parts of the body function over time. "And to date, we have had little understanding of what that looked like in a population like the Tsimane," he said. "Yet the conditions we find ourselves in today, where over half of the global population lives in cities, is just a minor blip in the long history of our species.

Groups like the Tsimane offer some of the best insight for our understanding of aging prior to industrialization and urbanization." All that being said, the researchers are quick to acknowledge that their index is still just a statistical composite. "It's not a complex network model showing how everything is related to everything else," Gurven said. What's amazing, he added, is that our global estimates of physiological dysregulation don't change much once the information from roughly 15 biomarkers are integrated. "Additional biomarkers tell you little, and it may not even matter which biomarkers you look at once you hit about 20. That seems to suggest that we're capturing something about the whole system," he explained. "And any single biomarker is only weakly correlated with our global index. But we'll learn much more about what it means and how important it might be once we can link dysregulation to useful outcomes, like functional performance, disease states and the likelihood of dying."

SOCIO – CULTURAL ANTHROPOLOGY

1. Race in Humans is a Social Construct

You may have heard the idea that **race** is a **social construct**. What does this mean?

Scientific advances in the 20th century showed that humans do not have **biological races**. But race continues to have profound effects on people's experiences and interactions. In other words, while race in humans isn't biologically real, race is a powerful social construct. More recent **discourse** on race among scholars, particularly in the fields of sociology and anthropology, has focused on the social power and meaning of race.

What is a social construct?

A social construct is a concept invented and generally accepted within a society. Its existence is grounded in human interactions and social institutions, and it is

society's shared knowledge that gives a social construct its power and meaning. People treat social constructs as real not because scientific inquiry has established their existence, but rather because they are important to society's shared social reality. For this reason, it is difficult to extend a particular social construct beyond its cultural context. In fact, most social constructs cannot be precisely defined.

Similarly to the society that invents them, social constructs are always in flux. They depend on their particular time and place. Gender is an example of a social construct. Individuals are assigned a gender, and society's expectations of an individual reflect their assigned gender. These expectations are different in different societies, and evolve over time.

For example, think of fashion. In some societies, there are strict expectations about what kinds of dress are acceptable for each gender. But a growing number of contemporary societies regard it as completely acceptable for men to wear pink, for women to wear pants, and for non-binary people to mix up their clothing between what's typically thought of as masculine and feminine.

Table 1: Societies are governed by several different, sometimes interconnected, social constructs. Race and gender are two of the most common social constructs found across all societies. However, other social constructs exist that significantly impact the world like money and disabilities. (Image by LabXchange © The President and Fellows of Harvard College)

The idea of race as a social construct can be puzzling. For centuries, many societies assumed that race in humans was biological. They believed that humans could be divided into distinct groups based on an inherited set of physical and behavioral differences, such as skin color, facial features, and hair type. However, scientific advances have proven that these divisions are based on arbitrary and **pseudoscientific** criteria (Graves & Goodman, 2022). The reality of race in humans is rooted in society, not biology.

The idea that race is a social construct is not new among scholars. In the late 1800s and early 1900s, the prominent African American public intellectual, W. E. B. Du Bois, openly criticized the use of race as a biological explanation for social and cultural differences in humans (Du Bois, 1897). Since then, Du Bois's attitude has come to be adopted by most scientists and intellectuals.

The idea of race has been a powerful tool for those in positions of authority. In the US, European colonists used the concept of race to justify the enslavement of

African people and to protect the wealth of white plantation owners (Graves, 2005). The social construct of race is intrinsically hierarchical. The idea that some races are superior to others is a key ingredient in race as a social construct. The effects of this hierarchical essence are visible everywhere today.

Social constructs have real consequences

The fact that humans don't have biological races doesn't change the reality that socially defined races have very real consequences. Understanding race as a social construct sheds light on how it has contributed to **systemic racism** and discrimination in the US. Health disparities between people of color and white people provide a key example.

Health disparities refer to the higher prevalence of death, illness, disabilities, or injuries that some groups experience relative to others. Rather than being a result of people's genetics, health disparities largely arise from social or economic forces, such as systemic racism. These injustices contribute to the unequal distribution of resources such as access to quality housing, health care, or education (Driver, 2021). Racism, not race, is the primary driver of racial health disparities.

A recent example is how COVID-19 affected different communities. Figure 2 shows that Indigenous, Pacific Islander, and Black communities experienced higher rates of COVID-19-related deaths than white people in the US. This disparity was not due to biological differences between these groups.

Rather, it was a product of underlying conditions that affected health outcomes during the COVID-19 pandemic, including socioeconomic status, access to health care, and exposure to the virus based on occupation (NCIRD, 2023). These underlying conditions, in turn, reflect past inequalities grounded in the social construct of race.

Figure 2: COVID-19 mortality rates in the US grouped by crude rate and age-adjusted rate. The crude rate is the total number of deaths during a specific time interval. The age-adjusted rate is a statistical process that compares different age distributions between communities, typically applied to rates of health outcomes. The age-adjusted rate is important because the rate of death differs by age, and age distribution differs by racial and ethnic group. (Image by LabXchange © The President and Fellows of Harvard College)

Social constructs inform all of society, including the law. Historically, the social construct of race in the US has treated "whiteness" as intrinsically superior to

"blackness". This can be seen in the passage of Jim Crow laws, which legalized **racial segregation** in the southern United States until the 1960s. Anti-black discrimination in the US, including that codified into law, reflects the intrinsically hierarchical nature of race.

Conclusion

"Things in this world aren't the way they are just because, someone had to make it that way. Which means the world could be made another way."
– Brendane Tynes (2021)

Unlike biological or physical limitations, social constructs are not unchangeable facts of life. They are constructed by people and can, therefore, be reconstructed by people. Of course, this takes work. Because social constructs are so important within society, they are highly complex and fraught with powerful meanings. But when a social construct helps perpetuate a hierarchy that gives some people unjust power over others, it's worth the effort to try to understand it more deeply. Becoming aware of how race has been constructed, and the injustice that construction has helped to perpetuate, is an important step towards reimagining a more equitable society.

2. The Appalling Educational Status of Muslims in India Needs Urgent

Education is one of the most important instruments for the development and empowerment of any marginalized community. Education plays an important role in helping people in gaining a respectful and dignified life within the society and is also helpful for enabling people to find a source of employment and livelihood. Sir Syed Ahmad Khan was a great socio-religious reformer and messiah of 'Muslims education' and he said, "It is the categorical verdict of all the nations and great seers of the world that national progress depends on education and training of the people. Keep in mind that life without education and training is like a bird without wings.

" Muslims are the second largest populous religious group after Hindus in the country. The National Minority Commission has identified Muslims as minorities along with Christians, Sikhs, Buddhists and Jains on the basis of religion. Among the minorities, Muslims have the highest population with 14.2

percent, followed by Christianity 1.7 percent, Sikhism 0.7 percent, Buddhism 0.5 percent, Jainism 0.4 percent and others at 0.7 percent. There are many states such as Jammu and Kashmir, West Bengal, Assam, and others in which population of Muslims is above 20% (Censes, 2011). Muslims, despite being the largest religious minority of the country are lagging behind as compared to the other religious minorities on all indicators of human development, such as living standards, financial stability, political existence, education and other aspects, thereby showing poor performance in most fields. Their socio-economic status is far behind that of other minorities and is also less than the national level. The factors of their educational backwardness have not fully and satisfactorily been studied by scholars and other governmental and non-governmental agencies.

Invariably most individual researchers, organizational surveys and government appointed committees find that Muslims are the most educationally backward community of the country. In this regard, a high level committee was headed by the Prime Minister of India in 2006, popularly called the Sachar Committee. The Committee found that Muslims have low level access to educational opportunities and their educational quality is even lower or is as bad as the Scheduled Castes (SCs) and Scheduled Tribes (STs) and Other Backward Classes (OBCs).

The report has also revealed that one fourth of Muslim children in the age group of 6-14 years have either never attended school or are dropouts. For children above the age of 17 years, the educational attainment of Muslims at matriculation is 17%, as against national average at 26%. Only 50% of Muslims who complete middle schools are likely to complete secondary education, compared to 62% at the national level' (Ministry of Education, GOI). Their literacy rate, mean year of education, representation in senior secondary education and higher education is below other communities in India. For example, the literacy rate among Muslims is 57.3%, which is far behind the national average of 74.4%. When we see other minority communities in India their literacy levels are far better than the Muslims.

The majority Hindus have a literacy rate of 63.6%. Literacy among other minority such as Jains is 86.4%, Among Christians it is 74.3%, Among Buddhists it is 71.8% and among Sikhsit is 67.5% in India. This shows that the Muslims have the highest illiteracy rate of any single religious community in India. Although the literacy rate for Muslim women was higher than SCs and STs women, but lower than others (Times of India, 2020). A study was

conducted by S.M.I.A. Zaidi in 2006 and found that the highest literacy among Muslims was in Andaman and Nicobar Islands at 89.8%, followed by Kerala 89.4%, while lowest literacy was found in Haryana 40%, and Bihar 42%. In the major states of the country (i.e. Uttar Pradesh, West Bengal, Bihar, and Haryana etc.) Muslims are educationally the most backward in comparison with other religious communities.

As per National Sample Survey Report of the 75th Round (2018), reported by the Times of India (2020) the Gross Attendance Ratio (GAR) of Muslims was lower (i.e., 100) than SCs (101), STs (102), OBCs, and minorities. The same case is also at upper primary level; here the GAR was lower than other communities. The GAR of Muslims at Secondary level was 71.9%, which was less than STs 79.8%, SCs 85.8% and from OBCs also. Similarly, in the case of higher secondary level and the GAR of Muslims was lowest i.e. 48.3%, below the SCs 52.8%, STs 60% and lowest compared to other communities as well. At the level higher secondary and above, their GAR has been 14.5%, just above the STs 14.4%, but below from the SCs 17.8% and other communities. In the age group of 3 to 35 years, among all communities, Muslims have the highest proportion that had never enrolled in formal educational institutions or programmes.

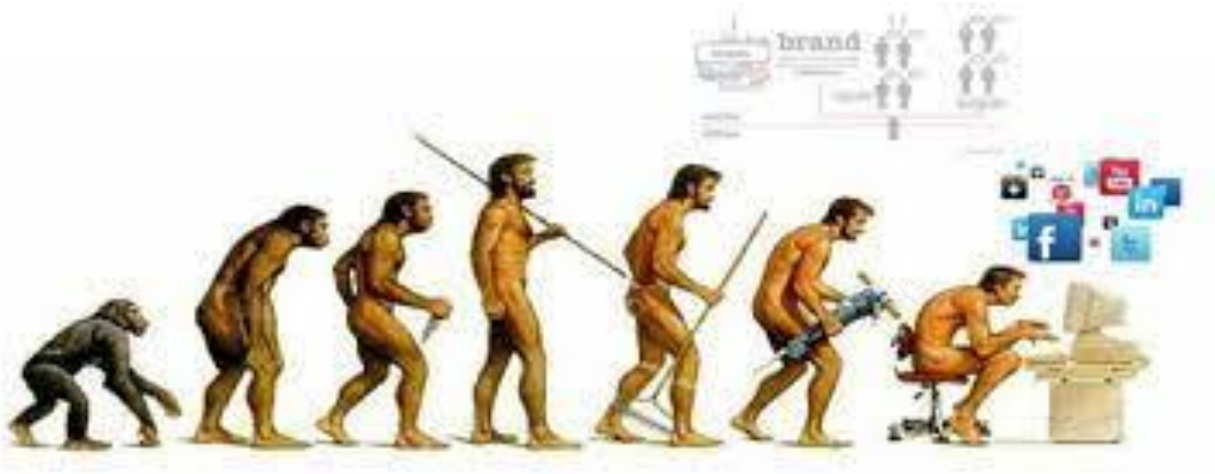
The enrolment of Muslims in higher education is pathological. As per All India Survey on Higher Education Reports (AISHE) (conducted by MHRD, GOI), it was revealed that the representation of the community in higher education was also the lowest compared to the communities such as SCs, STs and OBCs. From the above table, the growth rate of Muslims in higher education from the years 2010-11 to 2018-19 was 26.92%, while that of the STs was 20%, and that of the SCs was recorded at 25.50 %, and OBCs 23.96%. This clearly shows that, among all the minorities, Muslims have the highest growth rate, but in terms of proportion their enrolment is the lowest among these communities.

The importance of education and skill in the rise and fall of the communities is well known, and everyone also knows that in the present scenario (which is known as knowledge society) it is impossible to spend a self-dependent and dignified life without an education. From the above discussion and evidences, and various reports, it shows that, in the matter of education, the condition of Muslims at all levels (i.e. primary, upper primary, secondary, senior secondary and higher education) of education remains pathetic in comparison with other religious group as well as among SCs, STs and OBCs group.

It is a serious constraint in planning for the education of Muslims. A large population of Muslims is not only poor, but also deprived of the legacy of education. It is very difficult to get education for those Muslims who earn their livelihood through hard work and small businesses.

There are only two ways for these poor and hard working class of Muslims to get education, either government schools and colleges or madarsas. For this reason, in my opinion, there is an urgent need for intellectuals and philanthropists to come together, generate awareness about the importance of education and make them aware of the educational schemes, policies and programmes run by the government of India. Looking at the pathetic state of education among the muslims in India, state governments along with the Centre, need to pay special attention towards the education of Indian Muslims.

3. Lost in the metaverse? How digital anthropology can help leaders navigate uncertain futures



An anthropological approach to data analysis can address human concerns.

By 2030, 700 million people will inhabit the metaverse. These digital worlds offer endless possibilities for human interactions and social transformations, but they also come with inherent threats. Without a deep understanding of the cultures and dynamics at play, we risk losing our ethical bearings. To fully grasp the human experience in the metaverse, we need to embrace new fields of social sciences such as digital anthropology.

Creating a metaverse that works for everyone

The metaverse promises to seamlessly blend our physical and virtual lives, as the digital world moves towards an immersive and interactive future where humans and artificial intelligence (AI) coexist (as glimpsed by ChatGPT). The challenge is creating virtual worlds that are truly inclusive and ethical.
The question of how to shape the metaverse was discussed at the World Economic Forum's Annual Meeting in Davos in 2022 and in 2023, and twice Chris Cox, Chief Product Officer of Meta, framed the metaverse as merely a technical evolution of the internet, downplaying its potential social impact. Cox repeatedly described it as simply "the internet, but less flat". In contrast, Tom Boellstorff, a pioneering anthropologist exploring metaverse-like worlds, has called for an open the debate about what the metaverse is, recognizing how its definition will mould new social norms and standards.

Many uncertainties linger: Will the metaverse produce more or less disinformation? Will children be safe from inappropriate content? Will gaming and pornography drive its evolution? Will it extend discrimination and inequalities? We don't know, and that's worrying.
As the metaverse evolves, leaders need to consider how culture, technology and behaviours are intrinsically linked to ensure better outcomes for both businesses and society.

Decoding digital culture

To understand digital human cultures, decision-makers must bring "thick data" to the conversation with speed and scale. Thick data is the emotions, stories, meanings and tones of a situation. This data is implicit, often invisible, and traditionally gathered through human observations.
Digital anthropology leverages thick data, which provides qualitative and contextual insights, to better understand digital communities. When combined with big data, which provides a quantitative and statistical perspective, digital anthropology can reveal the human perspectives that are often missing from our analysis. Also, digital anthropology's thick data informs better decision-making while avoiding biases and short-sightedness.

With digital anthropology tools, the metaverse can benefit everyone, as leaders can use them to counter discrimination, exclusion and exploitation of cognitive biases. For example, suppose data scientists identify a digital community that distributes

threatening deepfake videos. In that case, digital anthropologists, equipped with new methods and technical innovations, could uncover the social and cultural reasons behind this behaviour and reveal the values that underpin this damaging practice. This science can also help us to protect women from online discrimination and violence, as we have confirmed in our work in 2022.

How to observe the human side of the metaverse

The first step for a team that wants to integrate human insights into its thinking is to observe the digital world without prejudice and immerse itself in online communities. The next step is to scale the scope and speed of its observations using technology. Instead of humans, imagine bots hiking through virtual worlds and delivering selected observations to multidisciplinary research teams. These bots are created with what we call "cultural algorithms" and they have been recently used to monitor electoral violence and moderate extreme speech online.

Unlocking this new layer of observational data can spark a virtuous cycle of innovation and trust. When decision-makers understand and react to the behaviour and values of their digital audiences, institutions work better. This, in turn, helps institutions become value-driven and better aligned with their communities, leading to increased trust and support. This virtuous circle may be key in restoring confidence in institutions.

Communities, consumers and social movements have the power to disrupt global institutions, markets, and belief systems using social media. They can divide us or bring us together on peaceful common ground. The metaverse will be the next arena for them to act. But these new worlds are fragile, and we only have one opportunity to build them ethically and effectively for all.
As digital worlds continue to evolve and transform society, it is imperative that ethical considerations are at the forefront of their construction. This is exemplified by the worldwide adoption of UNESCO's Recommendation on the Ethics of Artificial Intelligence, which raises critical questions about the impact of this rapidly advancing technology on individuals and societies.

The metaverse is not "the internet but less flat". The metaverse is a human system, a place for people, cultures and communities to come together. It is a human place that needs to be understood by the social and human sciences.

4. Proving" the language/culture connection

Several anthropologist called attention to the research report produced by Princeton University (link to full report here). The headline touts the research with the claim that "Machine Learning reveals role of culture in shaping the meaning of words". My response, and that of many others, was immediately snarky – we didn't particularly need computers to tell us something that has been amply demonstrated by the entire field of linguistic anthropology for the better part of a century, and by plenty of people paying attention for even longer. There was a bit of pushback on these comments, which ultimately all share a certain thematic element – that even if we already knew this, we, as linguistic anthropologists, should welcome this work, and the attention being paid to it, as a new methodology that supports what we know and do. The problem with this claim is...it doesn't do that at all.

And here, I have to own up to the fact that my own initial flippant response absolutely does suggest that it does, as I noted "the machines have caught up to my opening lecture in intro to linguistic anthropology". It is, of course, true that culture shapes meaning within languages, and that we teach that as a central principle of the discipline. The problem is, what the authors of this study mean by that and what we mean by that are fundamentally different things, as becomes apparent when you read beyond the headline. At a certain point, I hoped that reading the paper itself would mitigate some of the concerns I had, but alas, while obviously

written in a somewhat less hyperbolic way, the conceptual foundation, methodological application, and interpretation involved in this paper is, to my mind, a frustratingly flawed contribution to the study of the intersection of language and culture, for reasons outlined below.

The crucial issue for me is how the authors define 'culture' and establish a quantified version of 'cultural similarity'. In order to make this machine-based analysis work, culture has to be reduced to a checklist of features. To do so, the authors did in fact draw on anthropology – specifically, the Ethnographic Atlas available at D-PLACE, which is based on the work of GP Murdock and his students. There's an interesting anthropological rabbit hole to go down in examining the disagreements between Murdock and Edward Sapir, and critically considering Murdock's emphatically 'scientific' and mathematical approach to studying human social differences.

What I would ask the authors in this case, though, is whether they have chosen this approach to studying culture after a careful consideration of historical and contemporary thinking about the concept, or mainly because it is the one that allows them to fit the question of culture into the computational mold they wish to explore. Even the assumption that "languages" map neatly onto "cultures", as opposed to containing multiple ways of speaking, or 'languages' being spoken by diverse groups of people, or to having culture defined by multilingual and multivocal practices, doesn't hold within contemporary linguistic anthropology. Further, and relatedly, while the Princeton report about the study touts it as covering a remarkable number of languages, 41 is in fact an absolutely tiny drop in the bucket of global linguistic diversity — a point that becomes even more apparent when you look at the actual list of languages, which include 25 from the Indo-European family, 4 Turkic languages, 3 Uralic, and 1 each from the AfroAsiatic (Arabic), Sino-Tibetan (Chinese), Dravidian (Tamil), Kartvelian (Georgian), Japonic (Japanese), and Koreanic (Korean) families, as well as Basque.

While I was pleasantly surprised at a few of these inclusions (Georgian and Basque wouldn't fall in to the 'usual suspects' list), most of the list is extremely predictably narrow. Further, one might ask whether these labels even hold up all that well – which Englishes are represented here, or which versions of Spanish, Chinese, or any other "language"? This narrowness is made even worse as the analysis selects further and further for focus on Indo-European languages, because those are the ones about which the kind of diachronic language change information being used to classify degrees of linguistic/historical similarity is most available. The authors

don't justify this choice beyond the convenience level – or really, at all. Even to find the list of languages, one has to follow the links to get to the 300 pages of supplementary material that they provide. This indicates to me that they don't think their choice of languages used to make conclusions about 'universal' meanings and patterns of language culture relationships requires explanation.

A broader consideration of language at a global level would require attuning to the complexity of the concept of 'words', to the ways in which meaning is established in practice, or to the implications of things like polysynthesis in how these forms of 'universality' emerge. To illustrate what I mean, consider how the study talks about kinship terms and alignment. For the authors, the machine analysis demonstrates that this category of terms (at least the most 'common' ones – the examples they give are 'daughter', 'son', and 'aunt') tend to translate into other languages with a high degree of shared meaning.

But ethnographic analyses of kinship practices would suggest that even if the terms 'translate', they are used in extremely diverse ways. In many parts of Latin America, the Spanish/Portuguese terms 'tia' and 'tio', which translate as 'aunt' and 'uncle' are used to refer to almost any adult engaging with children, so during fieldwork in Brazil, I would often be introduced to kids by adults saying something like "Essa tia vem do Canadá" ("This auntie comes from Canada"). Sticking with languages represented on the list here, Susan Blum's work on "Naming Practices and the Power of Words in China" is one that I have assigned to introductory ling anth classes to talk about how many cultural beliefs we take for granted, such as the role of names and kinship terms, are in fact demonstrably diverse.

Blum's work is a good example that illustrates how "meaning" is not reducible to semantic "content" or "translatability", but rather has to be understood in terms of social practice. In other words, even asking the question of "what does this kinship term mean?" requires us to understand how a given culture approaches such "meaning". This starts to get at what I mean when I say that what this work 'proves' does not, in fact, align (pun intended, #sorrynotsorry) with what linguistic anthropologists talk about when they study how meaning is different across cultural contexts. There are major assumptions in the computational work that contradict the understandings of language and culture that most of us work within, and in particular, ignore the ways in which we examine language as a dynamic social practice. The ethnological Atlas material is, of course, not the only criterion the study uses for identifying cultural proximity, but digging in to other aspects of the analysis reveals similar assumptions.

As my friend Lavanya Murali noted to me, the treatment of geographic proximity and shared linguistic history, for example, doesn't really contend with the dynamics of how people interact across linguistic boundaries such that similarities can be produced through interaction, rather than as an inherent property of language — with both these elements, in turn, abstracted from an idea of "culture". All of this, for me, calls the conceptual framework that this research relies upon into question, and at the very least, demonstrates that this work doesn't support linguistic anthropologists' claims about language and culture. As such, this is not a matter of saying the same thing with different methodological evidence, but rather saying something completely different based on an entirely distinct set of assumptions about language and culture – ones that, in fact, I work really hard to teach students to examine as ideological claims rather than fundamental truths.

This even presents something of a meta-commentary, as it's worth noting that meaning doesn't even align within languages, and that the meaning of 'meaning' isn't always clear and translatable — I could go on, but you get the point. In addition to all this, I want to ask — why this research? Why ask these questions? This has been a central piece of the critique I have brought to my less-sarcastic Twitter comments, and that still holds after reading the study itself. The researcher interviewed makes the claim that this is the first "data driven" approach to the question, and further explains that the motivation comes from a desire to improve upon the time-consuming need to do things like "conduct long, careful interviews with bilingual speakers who evaluate the quality fo translations". The first comment is illustrative of a widespread belief that ethnography is not data, and that valorizes the quantitative and mathematical as "proof".

As many people noted, one of the reasons this raises our hackles is that we have been "proving" the interrelationships between language and culture in any number of ways for years, and this work actually doesn't engage with any of that material, preferring instead to jump back several decades and use a dataset that conforms to pre existing assumptions. The second point is more nuanced, but equally worth addressing – what's wrong with long, careful interviews? In fact, one of the reasons that the list of languages used here is so limited is because those are the ones for which a sufficient amount of long, careful interviews, recorded material, and myriad other forms of data are available.

It's not clear to me, then, that this kind of work in any way does away with the need to develop that material in the first place, raising the question of what it accomplishes. As I noted in tweets, the decisions about what questions to ask are ones that deserve scrutiny, because resources are spent investigating these

questions, which means those resources aren't available for other questions. And if resources are being consumed doing research that ignores and dismisses work on apparently related topics, it does have a negative impact on that work – so, speaking for myself, as a linguistic anthropologist, it's disappointing and frustrating to see not only the promotional elements of this work, but to see how the project itself represents the questions that we even need to understand regarding language and culture.

PAPER - 2

INDIAN & TRIBAL ANTHROPOLOGY

1. Hakki Pikkis caught in Sudan conflict: Why this tribe of bird catchers travels to Africa from Karnataka

The Hakki Pikki is a tribe that lives in several states in west and south India, especially near forest areas. More than 181 members of the community from Karnataka are stuck in violence-hit Sudan.

- More than 181 members of the Hakki Pikki tribal community from Karnataka are stuck in violence-hit Sudan, even as the government is making efforts to bring them back.

Hakki-Pikki tribes

Who are the Hakki Pikki?

- **About**

    - The Hakki Pikki is a tribe that lives in several states in west and south India, especially near forest areas.
    - Hakki Pikkis (Hakki in Kannada means 'bird' and Pikki means 'catchers') are a semi-nomadic tribe, traditionally of bird catchers and hunters.
- **Population**
    - According to the 2011 census, the Hakki Pikki population in Karnataka is 11,892.
    - They live majorly in Davangere, Mysuru, Kolar, Hassan and Shivmogga districts.
    - In different regions, they are known by different names, such as Mel-Shikari in northern Karnataka and Maharashtra.
- **Clans**
    - The Hakki Pikki move in groups from place to place in search of livelihood.
    - They are divided into four clans, called Gujaratia, Panwar, Kaliwala and Mewaras.
    - These clans can be equated with castes in the traditional Hindu society.
    - In the olden days, there was a hierarchy among the clans, with the Gujaratia at the top and the Mewaras at the bottom.
- **Language**
    - Despite being surrounded by Dravidian languages and living in southern India, the community speaks an Indo-Aryan language.
    - Their mother tongue was designated **'Vaagri'** by scholars. They communicate in 'Vaagri' at home but speak in Kannada when conducting daily business.
        - UNESCO has listed 'Vaagri' as one of the endangered languages.

Where do they live?

- Hakki Pikki people are believed to hail originally from the bordering districts of Gujarat and Rajasthan.
- As per the researchers, they came to the south in search of game.

What were their traditional jobs, and what do they do now?

- Traditionally, Hakki Pikkis lived in forest areas, leading a nomadic life for nine months a year and coming back to their permanent camps for three.

- Earlier, men of the tribe would hunt while women begged in villages. But as the wildlife protection laws became stricter, the Hakki Pikkis in Karnataka started selling spices, herbal oils, and plastic flowers in local temple fairs.
    - Later, they started selling their products in Africa.

- Education levels among the Hakki Pikkis are still low.

What are their rituals and customs?

- Hakki Pikkis in Karnataka follow Hindu traditions and celebrate all Hindu festivals.
- They are non-vegetarians. The eldest son in a family is not supposed to cut his hair so that he can be identified easily.
- The tribe prefers cross-cousin marriages. According to locals, the usual age of marriage is 18 for women and 22 for men.
- The society is matriarchal, where the groom gives dowry to the bride's family.

2. Andhra's Koya tribe faces brewing conflict over sacred Mahua flower

The *Koya tribe* resides in Andhra Pradesh. They face a cultural crisis due to intensified enforcement of liquor regulations by the Special Enforcement Bureau (SEB).

About Koya tribe

- Koya are one of the few *multi-racial and multi-lingual tribal* communities in India.
- They live in the forests, plains, and valleys on both sides of the *Godavari River* which lies in Andhra Pradesh. Many also live in the states of *Madhya Pradesh* and *Orissa*.
- They believe their main deity still resides in a cave in the Bastar region.

Cultural Crisis (Disruption of Traditions):

- Mahua liquor is *brewed* from the *flowers of the Mahua tree* which is integral to Koya cultural and religious ceremonies including naming ceremonies, weddings, and death anniversaries.
- *Police raids* and seizures of Mahua liquor disrupt these traditions causing cultural shocks within the community. *For example*, recently the naming ceremony of Madakam Janakamma's child was held without Mahua liquor due to SEB raids.

Tribal Rights (Legal Challenges and Rights):

- *The Andhra Pradesh Prohibition Act, 1995*, does not exempt the Koya tribe from brewing and storing Mahua liquor, despite its cultural significance.
- *The Panchayat (Extension to Scheduled Areas) Act (PESA), 1996 empowers* the gram sabha to protect tribal traditions and culture but its implementation is questionable as SEB raids continue unabated.
- Koya villagers are often coerced into *paying bribes to avoid legal charges*, highlighting the tension between law enforcement and tribal rights.

Impact on Collection(Economic Consequences):

- Many Koya households have ceased Mahua flower collection due to fear of police raids, significantly affecting their primary source of income.
- Destruction of freshly collected flowers during raids further disincentivizes collection, reducing the supply of Mahua flowers to weekly markets (shandies) where they are exchanged for essential goods.

Guardians of Culture (Preservation of Heritage):

- The Koya tribe, especially those not displaced by the Polavaram irrigation project, are seen as custodians of their culture. However, displacement and integration with non-tribal communities threaten their cultural identity.

- Local leaders and activists argue for the need to empower Koya women with training in producing value-added products from Mahua flowers, rather than undermining their traditional practices and economic activities.

Legal and Policy Measures

- Amend the Andhra Pradesh Prohibition Act, 1995: Introduce exemptions or special provisions that recognize and protect the traditional brewing and usage of Mahua liquor for cultural and religious purposes by the Koya tribe.
- Strengthen Implementation of PESA Act: Ensure that the Panchayat (Extension to Scheduled Areas) Act (PESA), 1996, is fully implemented. Empower Gram Sabhas to have a greater say in protecting tribal traditions, including the brewing of Mahua liquor.

Conclusion: The enforcement actions by the SEB, while aimed at regulating liquor, pose a significant threat to the Koya tribe's cultural heritage and economic well-being. Balancing legal regulations with respect for tribal traditions and rights is crucial to preserving the Koya way of life.

3. Rights ensured under FRA are not just 'enjoyment rights'

The misreading of the forest title deed, has become a stumbling block to the entitlements of title holders Some 83 tribal farmers of Girjai (V) in Bajarhatnur Mandal, Adilabad district (Telangana) were being made to go around government offices, seeking permission for digging bore wells in their own titled forest lands.

Kumra Darmu and Pendor Kisan, two of these 83 farmers, had to finally seek the intervention of the Project Officer, Integrated Tribal Development Agency, in

Utnoor against the objections of forest officials in digging bore wells in their forest *patta* lands.

These are not stray cases in Telangana. Similar requests for permission to dig bore wells in the forest title lands of 694 tribal farmers in Bhadradri Kothagudem district have not yet been cleared by the district authorities.

It is not an uncommon argument of the authorities, more particularly forest bureaucrats, that the rights recognised under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Rights) Act or FRA 2006 only permit the right-holders to enjoy their rights over forest lands, but not ownership of the forest land over which the forest dweller has been issued title.

A similar perception is also held among the higher tribal welfare officials in the country which was reflected during a recent discussion held on the implementation of forest rights under "Vikasit Bharat", an initiative of the Union government.

It seems this understanding is emanating from the idea that that the State is the only owner of all forest land, unlike revenue lands, and the rights ensured under FRA are only 'enjoyment rights'.

This position of the administrative authorities negates the intended ownership rights of the forest dwellers and the Gram Sabhas recognised over forest lands.

In fact, state governments are required to ensure livelihood opportunities are made available and enhanced on lands of forest dweller farmers by involving all the relevant departments under Rule 16 of FRA. The state government is to carry these out by providing post-claim support for the improvement of productivity and land development of the recognised forest lands of title holders.

FRA was enacted in 2006 by Parliament to undo the historic injustice done to Scheduled Tribes and other traditional forest dwellers in the country. It recognises the individual, community, and community forest resources rights of tribals and other traditional forest dwellers in the forest areas whether notified or not. Titles are issued to individuals for habitation and for self-cultivation. These rights are heritable but not alienable or transferable. Titles for community rights and community resource rights are issued to the concerned Gram Sabhas.

As per section 6(6) of the FRA, the District Level Committee (DLC) is to give the final nod of approval of the record of forest rights. Under Rule 8(h) of Rules 2012, it is the responsibility of the DLC to issue title under the Act and ensure that these

rights are duly entered in the record of rights of both the revenue and forest departments under the relevant state laws as per Rule 12 A of the amended Rules 2012. The forest rights are conferred free of all encumbrances [Sec.4(7)].

The misreading of the forest title deed, has become a stumbling block to the entitlements of title holders. This is to be seen from several provisions of other enactments made either by Parliament or state legislatures that are inter-related to forest rights.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR 2013) ensures compensation to those whose forest lands are acquired for projects by user agencies, whether belonging to the public or private sector.

Notably, Section 3 r(ii) of LARR 2013 defines 'land owner'. It includes any person who is issued titles for forest rights under FRA 2006. The forest land title holder is considered as 'land owner' on par with a title holder on Ryotwari revenue lands. Ryotwari was a system of land revenue implemented in British India.

Therefore, considering the rights recognised under FRA only as 'enjoyment rights' over forest lands is indeed gross misinterpretation of the law. It also amounts to a violation of the provisions of FRA, which is a punishable offence. Moreover, the provisions of FRA are in addition to the beneficial provisions of other legislations, not in derogation to them. Hence, the violations of FRA are liable to be construed as violations of these other laws.

4. Wancho Tribe of Arunachal

The Wancho tribe of Arunachal resides in the Eastern part of Arunachal Pradesh amidst the Patkai range and occupies the district of Longding.

According to mythology, the word Wancho is derived from local term *Wang-cho* means the hill man of Wang follower or hill man lived under the ruler of king. The word Wang stand for *Wang* (king) and the *Cho* means Hillman. The Wancho tribe resides in the Eastern part of Arunachal Pradesh amidst the Patkai range and occupies the district of Longding. They have a population of 35,000. Culturally Naga, they are ethnically related to the Nocte tribe of Arunachal Pradesh and Konyak tribe of Nagaland. The Wancho tribe of Arunachal and Konyak tribe still today share similar names and tradition.

Konyak is the largest ethnic group in Nagaland and known for their tradition of headhunting and tattoos.

The wancho society is characterized by the existence of the class distinctinction the "Wangham" or the chief and " Wangpan "the commoner. The chief enjoys special facilities and are honoured in every sphere of life. In addition to this, 'Wangsa' and 'Wangsu' are another two classes from the Wancho community which spring from the matrimonial union between Wangham father and Wangpan mother occupying the third stratum of social classification or hierarchy. Social distinction between the classes is very scrupulously observed in every sphere of their life. As for example in the village festival the Wangpans are not allowed to take meal in the same row with the Wangham. They are also not allowed to marry a girl from Wangham's family although there is no restriction on the part of Wangham to marry a Wangpan girl.

Religion of the Wancho Tribe of Arunachal

The Wancho tribe of Arunachal, together with the Nocte and a small minority of the Konyak, still retain the belief of Animism. These Animist Wancho believe in the existence of two powerful deities, Rang and Baurang

Christianity has gained some followers among the Wancho, many of whom belong to the Baptist or Roman Catholic denominations. Acceptance of Christianity has largely to do with comparative influences from the Nagas of Nagaland as well as changing perspectives towards headhunting. However, this has also resulted in the decline in many aspects of their traditional culture, which has strong associations with religion. At the 2001 census, just 10% of the Wancho were Hindu and another 16% were Animist.

Culture of the Wancho Tribe of Arunachal

Tattooing plays a major role among the Wancho tribe of Arunachal. According to tradition, a man is tattooed on his four limbs and his entire face, with the exception of certain regions around the eyes and the lips. The women adorn themselves with necklaces and bangles, along with some light tattooing as well.

The prime festival of the Wancho is Oriah, a festival between March to April, for a period of six to twelve days interspersed with prayer, songs and dances. Villagers exchange bamboo tubes filled with rice beer as a mark of greeting and goodwill. Pork skin is then offered to the village chief as a mark of respect. This festival continues for several days just sowing of Jhum paddy and Pigs, buffaloes and mithuns are sacrificed and feasts are arranged in each and every morungs (dormitories). Boys and girls, wearing ceremonial costumes, sings and dance during this Oriah. People dances around a "Jangban", a long ceremonial pole planted during Oriah.

The Wancho tribe of Arunachal are traditionally governed by a council of elderly chieftains, known as Wangham or Wangsa.

Like most neighbouring tribes, the Wancho construct houses made out of wood and bamboo, and roofs were thatched with dry leaves. Dormitories, known as Murung, where the boys are trained to be men by their fathers. Although the girls do not have dormitories like the boys, they sleep in one big, single house, with the care of an old lady.

Until 1991, human headhunting was practised among the Naga tribes especially among Konyak and Wancho tribe of Arunachal, and both the government and missionaries have taken steps to ban the practice of headhunting, which is now restricted to animals.

5. Andaman's Onge Tribe

The king and queen of the "***Onge tribe***" welcomed a baby boy in the Andaman Islands, marking a significant moment for the tribe. With the arrival of the newborn, the **tribe's total population now stands at 136**, as confirmed by an official source.

About Onge Tribe

- The Onge are **PVTGs** (Particularly Vulnerable Tribal Groups) native to the Andaman Islands.
- They have traditionally been **hunter-gatherers and fishers**, while also practising **cultivation**.
- Their **population** significantly **decreased after colonization**, from *672* in 1901 to around 100.
- They practice a form of **animism**, with **ancestor worship** being significant.
- They traditionally make **decisions** through **group consensus**.
- Today, the surviving members are confined to two reserve camps on **Little Andaman**: **Dugong Creek** in the northeast, and **South Bay**.
- Genetically, the Onge are **distantly related to East Asian populations** and show affinities with **Southeast Asian Negrito ethnic groups**.

Other Indigenous People of Andaman and Nicobar

1. Great Andamanese Tribe

- One of the largest tribes, the Great Andamanese tribe is currently settled on the **Strait Island** under the Andaman & Nicobar Administration. Despite their historic bravery, diseases and other challenges have reduced their **population to 43** individuals as of the 2001 census.
- ***Government initiatives***: The administration provides housing, coconut plantations, and rationing to support their livelihoods and well-being.

2. Jarwas Tribe

- Jarwas inhabit the Western coast of the Middle and South Andaman Islands. They are known to be **hostile** but have shown receptivity to friendly contact expeditions since 1974. Their present numbers are estimated at between 250–400 individuals.
- Jarwas are nomadic **hunters and gatherers**, using traditional methods like **bows and arrows** for hunting and fishing.

3. Sentinelese Tribe

- Sentinelese reside on the small **North Sentinel Island**, maintaining a wary stance towards outsiders.
- Despite initial scepticism, contact expeditions have made progress since 1991, albeit with caution.

Who are the Particularly Vulnerable Tribal Groups (PVTGs)?

- These groups are among the **most vulnerable sections** of our society as they are few in number, and have not attained any significant level of social and economic development.
- They generally inhabit **remote localities** having poor infrastructure and administrative support.
- **75 such groups have been identified** and categorized as Particularly Vulnerable Tribal Groups (PVTGs).

Origin of the concept

- The **Dhebar Commission (1960-1961)** stated that within Scheduled Tribes there existed an inequality in the rate of development.
- During the ***fourth Five Year Plan (1969-74)*** a sub-category was created within Scheduled Tribes to identify groups that were considered to be at a lower level of development.
- This sub-category was named “Primitive tribal group”.

- In **2006** the government of India proposed to **rename PVTGs.**

Features of PVTGs

- The features of such a group include a:

1. Pre-agricultural system of existence
2. The practice of hunting and gathering
3. Zero or negative population growth
4. Extremely low level of literacy in comparison with other tribal groups

- Groups that satisfied any one of the criteria were considered PTG.

6. Unying Festival of Adi community of Arunachal Pradesh

Recently, the Union Minister of Ports, Shipping & Waterways and Ayush attended the colourful Siang Unying Festival.

About the festival:

- The festival of Unying is celebrated to herald the season of cultivation, beginning of the Adi community's new year, arrival of spring seasons as well as a great way to strengthen the bond among the community.

- The Adi tribes celebrate a number of festivals, but Unying Aaran is the prime festival for them.
- **Unying Aran is one of the oldest festivals of the Adi community commemorating the arrival of spring season.**
- Unying Aran is basically a hunting festival followed by the Adi tribesmen. It is the first festival of the Adi 'new year'.
- **It is the festival which unites all the members of the community and they all pray for the bumper harvest.**
- In this festival, it is tradition for all male members of a family to go on a hunting and stays in the jungles for a week.
- The majority of Adi traditionally follow the tribal Donyi-Polo religion. Worship of gods and goddesses like Kine Nane, Doying Bote, Gumin Soyin and Pedong Nane, etc.
- It is traditionally celebrated with 'Bari' songs sung by male elders and 'Yakjong' dance performed by youths (boys and girls) in villages. Through these performances, they narrate stories of the origin of the festival. Villagers also pray for the well-being of their tribesmen.

About the tribe:

- **The Adi people are one of the most populous groups of indigenous peoples in the Indian state of Arunachal Pradesh.**
- A few thousand are also found in the Tibet Autonomous Region, where they are called the Lhoba together with some of the Nishi people, Na people, Mishmi people and Tagin people.
- They live in a region of the Southern Himalayas which falls within the Indian state of Arunachal Pradesh and the Mainling, Lhunze, Zayu, Medog, and Nyingchi counties in the Tibet Autonomous Region, China.
- **All the ethnic groups recognizing themselves as "Adi" are believed to be descendants of the Abutani/Abotani.** The older term Abor is an exonym from Assamese and its literal meaning is "independent". The literal meaning of adi is "hill" or "mountain top".

2. Scheduled Tribes panel requisitions FRA action reports from top court

- Against the backdrop of a face-off between the Union Environment Ministry and the National Commission for Scheduled Tribes (NCST) over the Forest Conservation Rules, 2022, NCST has secured the implementation reports of the Forest Rights Act (FRA) of all States and UTs.

- As the Union government introduced the new Forest Conservation Rules, 2022, NCST had urged the Environment Ministry to put a hold on the implementation of the rules as they violate the provisions of the Forest Rights Act (FRA), 2006.
    - However, the Ministry replied by saying that the rules were formulated under the Forest (Conservation) Act, 1980 and that NCST's apprehensions were "not legally tenable".
- NCST invoked its constitutional powers i.e. its powers under Clause 8d of Article 338A to approach the Supreme Court directly and sought all materials filed before the court in connection with a batch of petitions challenging the constitutionality of the FRA.
    - The Supreme Court has ordered that the sought documents must be provided to NCST.
- NCST is now looking to review the overall implementation of the FRA, and evaluate the rejection of titles and encroachments on forest land.
    - Further, the commission will propose recommendations to further secure the rights of forest dwellers based on its constitutional mandate.
- As per the data tabled in Rajya Sabha in December 2022, title rights were issued against just 50% of the claims over forest land made under the FRA as of June 2022, with maximum pendency and rejection seen in cases of individual claims.

7. NCST functioning with less than 50% of sanctioned strength

National Commission for Scheduled Tribes
Government of India

ST Panel functioning without mandatory ST Member for three years now; Commission just has one Chairperson and one Member

Data presented by the Ministry of Tribal Affairs (MoTA) on Monday in Lok Sabha revealed that the National Commission for Scheduled Tribes (NCST) is currently functioning with less than 50% of its sanctioned strength, with Commission officials disclosing to *The Hindu* that it is becoming increasingly difficult to undertake its function without the requisite staffers.

According to data from the Commission, rules provide for the ST panel to have one Chairperson, one Vice-Chairperson, and three Members (two among V-C and Members must be from ST community). Currently, it just has a Chairperson (Harsh Chouhan) and one Member (Ananta Nayak) with all other positions, including that of the mandatory ST Member, vacant for the last three years.

Responding to a question in Lok Sabha from Andhra Pradesh MP Chinta Anurdha (YSRCP), Minister of State for Tribal Affairs Bishweswar Tudu said, "As on 31.1.2023, against the total sanctioned posts of 124, 54 posts are filled and the vacant posts are 70." While Group A posts in the NCST are filled by the Ministry, Groups B and C posts are the NCST's responsibility.

One senior Commission official told *The Hindu* that the panel has been sanctioned one Superintendent of Police, one Law Officer and one Accounts Officer (all Group A posts), neither of which had been filled since 2004. "The recruitment rules for them have not yet been framed and this is a serious lapse on the Ministry's part," they said.

Another official added that it is very essential for NCST to have key positions like Research Officers, Investigators and Directors filled for it to function as per its Constitutional mandate. "Several positions in the Commission Secretariat are also vacant but the priority should be to at least appoint all sanctioned Members and Vice-Chairperson as per mandate," the official said.

In his reply in Parliament, Mr. Tudu said, "The Ministry of Tribal Affairs and National Commission for Scheduled Tribes are in the process of filling of vacant posts. Since, promotion and filling up of vacant positions in NCST is a continuous process, the Ministry of Tribal Affairs and the NCST are continuously making efforts for filling of vacant positions on priority basis."

8. **Involving indigenous people in environmental governance — the SixthSchedule way**

Customary practices of the North East's tribal population are harmonious with nature. Extensive recognition and conferment of rights over the forest are belated legislative actions In most indigenous societies, people believe humans and nature are deeply connected and inter-dependent, almost like kin to one another. Indigenous people across the world have often been regarded as exemplars of environmentally sustainable living. The impact of their subsistence livelihoods

was apparently kept in check by customary laws to ensure they lived by the laws of nature. Solutions to a lot of current environmental problems lie in these traditions.

These marginalised groups are gaining recognition as vital stewards of our environment and are gaining a role in environmental governance due to their unique traditions and laws, amid depleting resources. This UN proclamation recognised the role of indigenous people in environmental management and governance at an international level. A part of the Constitution of India also recognised this bond between indigenous people, their land and customary rights.The Sixth Schedule of the Constitution is unique because it confers autonomy and right to self governance to indigenous people living in parts of north-eastern India.

The Sixth Schedule Provisions over the administration of tribal areas in Assam, Meghalaya, Mizoram and Tripura are contained in the Sixth Schedule. It provides for the establishment of autonomous district and regional councils. Each of these states have a couple of such councils, except Tripura which has one.These autonomous district and regional councils have their members elected from the local tribal population of their respective regions. In addition to the elected members, a few are nominated by the governors The history of autonomous district councils goes back to the time of gaining independence. The Interim Government of India appointed the North-East frontier (Assam) Tribal and excluded areas committee to the Constituent Assembly, under the chairmanship of Gopinath Bordoloi, the first Chief Minister of Assam.The committee recommended the setting up of autonomous district councils to provide autonomy and self-governance at the local level to the tribal population. The recommendation was later incorporated into the Sixth Schedule, Article 244 (2) and Article 275(1) of the Constitution of India.

The district and regional councils almost function as autonomous states with significant executive, legislative and judicial powers. The councils have powers to legislate over several matters including land use, management of forests (except reserved forests and sanctuaries), inheritance, tribal customs, marriages, personal laws, appointment and succession of headmen, etc. The councils have their own laws and regulations over the management of forests. Many of these laws derive from customary laws and often appreciate the close age-old relationship shared between indigenous people and the environment. A few such legislations include: 1. The Mizoram Forest Act, 1955 2.

The Karbi Anglong Forests Act, 1957 3. The United Khasi-Jaintia Hills Autonomous District (Management and Control of Forests) Act, 1958 and its subsequent rules of 1960 District council forest laws — the enabling factor? An analysis of laws like the United Khasi-Jaintia Hills Autonomous District (Management and Control of Forests) Act, 1958 show how the involvement of indigenous people in environmental governance was enabled. This was done by placing them at the focal point of forest management.The primary objective of the aforementioned law is the control and management of forests in the autonomous district council areas of Meghalaya's Khasi and Jaintia Hills. Deriving from local customary laws, this legislation classifies forests under the autonomous district council into eight different categories. These categories include private forests, sacred forests, green blocks, village forests, district council reserved forests and so on.

The management of these forests exclusively lies in the hands of the local communities, apart from the categorisation. Section 3 (ii) of the act, for example, describes sacred forests. This, in turn, has benefitted both people and nature. A good illustration of this is the successful Reducing emissions from deforestation and forest degradation (REDD+) initiative in Meghalaya's Mawphlang region, where 3,500 households from 62 villages managed to conserve and restore over 27,000 hectares of sub-tropical hill forests. This has not only led to the restoration of biodiversity and water sources like streams, but also increased the livelihood and income of local tribal people.

Despite several positive aspects, the Sixth Schedule is not free from shortcomings. Over the years, there were several instances of corruption in the autonomous councils. The village heads or community leaders often reap most of the benefits, with barely any development trickling down to the actual beneficiaries. Laws over the control and management of forests in all the areas under the Sixth Schedule are not uniform as well. In Assam's Karbi Anglong district, the Karbi Anglong Forests Act, 1957 does not confer rights to communities over control and management of forests, unlike Meghalaya. Rights over forests lie exclusively in the hands of the district council. Apart from this, certain district councils do not have laws over the management and control of forests. They are, instead, under the jurisdiction of a state law.

The road ahead The success story of Mawphlang necessitates replication and serves as an apt model for showing the benefits accrued from involving indigenous people in environmental governance through incentivised

programmes. Active community engagement in forest management, however, is still missing from certain district council legislations. These laws need amendments to increase participation of indigenous populations and legislations need to be adopted immediately in areas where they are missing. The ambit of the Sixth Schedule is not as inclusive as one would expect. Several tribes — particularly in Assam — are still outside its realm.

There lies a vast scope within the existing framework itself to include tribes such as the Mising, Tiwa, Rabha, etc who have long demanded inclusion. The customary practices of the North East's tribal population are harmonious with nature. Extensive recognition and conferment of rights over the forest are, thus, belated legislative actions. Despite its few shortcomings, the Sixth Schedule holds the potential to redefine community engagement and restore forest management to a co-dependent existence once stolen from these tribes by foreign powers. The future lies in restoring the past.

9. Chenchus lured with promise of a 'good life', forest open to plunder

Going by their sociocultural transformation, being driven by the influence of the so-called mainstream forces, indications are that an assisted collapse of their traditional lifestyle, is now imminent

Have Chenchus living inside the Nallamala forest reached a point where there is no going back to their roots?

Going by their sociocultural transformation, being driven by the influence of the so-called mainstream forces, indications are that an assisted collapse of their traditional lifestyle, is now imminent.

The fear of being forced to migrate exists as an undercurrent among the Chenchus, who had strongly resisted several attempts to relocate them for decades, whether it was the Telugu Ganga Project in the 80s, exploration for diamond deposits (an agreement made with De Beers) in the early 2010s, or the most recent attempts by the Atomic Minerals Directorate (AMD) to explore mining of uranium in the Amrabad Tiger Reserve and the Nagarjunasagar Tiger Reserve since 2018.

Activists point out that though no excavation has taken place yet, officials from the Geological Survey of India (GSI) and AMD have been visiting the forest areas where markings were made for uranium exploration, despite a resolution passed in Telangana Assembly in 2019 against it.

"Petralchenu (near Udimilla)-Maddimadugu-Padara and Rayalagandi-Padara-Prathaparudruni Kota are the areas where surveys are actively being conducted. The last time GSI and forest officials started conducting surveys, we managed to prevent them from doing so. But there are mud roads being laid deep inside the forest and markings being made. Last month, Niranjan Kumar, a scientist from AMD, was also here. When the local media asked him, he said that it was routine survey, but we are sceptical about it," says Nasaraiah, an activist.

People's suspicion grew with the recent attempts by the forest department to relocate Chenchus and other forest dwellers from Kollampenta in Amrabad mandal, Geesugondi in Padara mandal, Kommenapenta and Sarlapalli habitations in Amrabad mandal.

The forest officials are not forcing them to relocate, but are offering them Rs 15 lakh per household as compensation, promising them land at an alternative location. However, local leaders say that there is no land left to be assigned to oustees. Chenchus from a few habitations who were relocated in the past had in fact returned to their earlier locations.

As per sources, 1,004 acres have been transferred from the Revenue department to the Forest department in Tirumalapuram, Laxmapur, Vonguronipally and Rayalagandi villages in Padara mandal. Rumours are doing rounds about possible exploration for diamonds there. There have been regular attempts to hunt for treasure at Prathaparudruni Kota and other temples in the forest area.

Chenchus living in the core forest area of Lingal mandal have been undergoing a sociocultural transformation in recent times, mostly due to the outsiders' influence on them. Annual festivities like Bourapur jatara and Saileshwaram jatara have witnessed an adverse impact on the indigenous lifestyle of Chenchus.

Prevalence of alcoholism, religious conversions with money as an allurement have left Chenchus divided politically and have contributed to a change in their lifestyle and mentality.

"For decades now, Chenchus have been reduced to people who depend on alms from the government. Real development still eludes Chenchus who want to go for

agroforestry if supported. Honeybees are rapidly going extinct because of chemical fertilisers and pesticides outside the forest, but here, they still have a safe habitat, though their population is on the decline.

There are Central schemes to empower farmers to go for beekeeping but they don't realise that Chenchus can be a great resource for that," said Thokala Guruvaiah, General Secretary, Chenchu Lokam. He added: "We have been representing to the political and administrative establishment for years, requesting them to construct check-dams inside the forest, so that water could be conserved for agriculture and wildlife to flourish. But nobody cares."

Community leader are not committed: Insiders

For years, Chenchus, who have exclusive right to fish in the backwaters of the Krishna River, have not been able to claim it. Migrant fishermen working under a powerful ring of smugglers from AP continue to exploit the fish wealth of the Nallamala. Hope is bleak, as insiders feel that the leaders of the movements are themselves not committed and Chenchus presently lack the drive to either fight back or resist the attempts to dispossess them of their natural habitat which they have been protecting since time immemorial.

NGOs encourage them to join mainstream

NGOs working with them have been successful in grooming Chenchus to consider joining the mainstream - a scenario that puts them in direct competition with the socioeconomically empowered masses while leaving the forest open for exploitation of natural and hidden resources.

10. Fighting Malnutrition In Odisha's Angul, A Story That Inspires All

How a remote district became a sterling example that people can overcome their nutritional adversity with will, guts and wisdom

Located in a remote corner of Odisha is a small district of about 6,232 square km, named Angul. A small district, it has got its own story to tell about its efforts in battling malnutrition and showing its people the path towards healthy life.

Angul is bounded by Dhenkanal and Cuttack to the east, Deogarh, Kendujhar and Sundergarh district to the north, Sambalpur and Sonepur to the west, and Boudh

and Nayagarh in south. It has a considerable population of scheduled castes, scheduled tribes, and localised population of Particularly Vulnerable Tribal Groups (PVTG)s, who are much more deprived in every way.

Endemic malnourishment

Malnourishment has been a very common part of people's life for long. Most of the women are still undernourished, as a result of which their children are also deprived of the basic needs they require to lead a life of well-being. Though the district on the whole displays better performance on the basis of indicators such as anaemia, underweight and stunting of children under age five, yet undernutrition continues to be a matter of concern for the villagers.

There are certain reasons that have played a pivotal role in giving rise to malnutrition in Angul. Lack of awareness and literacy among the women have led to inadequate care for children, which has in turn led to excessive prevalence of anaemia and stunting. The mothers in the district are not very aware of the healthcare services that they should avail for themselves, and especially for their children, by getting themselves registered in the anganwadi centres. Moreover, wrong feeding practices and lack of proper care of women during pregnancy and delivery have contributed to widespread undernutrition in Angul district.

The movement for nutrition

Then came Angul Pushti Adhikaar Abhiyaan (APAA), a programme initiated by the people of the district to foster nutrition and promote good health for women and children. The movement aimed at educating the women of the district, to make them realise the importance of nutrition.

A movement that brought over 2.000 people together from different parts of the district--including the sarpanch, anganwadi workers, ward members and various influential people—on one platform to address the issue of malnourishment, AAPA made sure to free Angul district from the clutches of malnutrition. It also aimed at imparting all the major schemes of ICDS, such as Hot-Cooked Meals (HCM), Take Home Ration (THR), and Supplementary Nutrition Programmes (SNP) to the children and to mothers.

Key objectives

The AAPA has five key objectives:

To increase people's awareness of anganwadi centres and raise demand

·To monitor ICDS services through three primary committees--Jaanch Committee, Maatru Committee, and committee of Panchayati Raj Institute members—by building their monitoring capabilities.

·To train and support anganwadi workers in reaching out to the section of people who are not able to avail the facilities.

·Create community platforms to discuss issues around nutrition.

·Encourage participation of the sarpanch across villages in discussions, so that they can foster nutrition in their districts.

Monitoring change

"We formed the Jaanch Committee to monitor the overall development of the children," says Bidyut Mohanty, head of non-profit, SPREAD, who has played a pivotal role in giving the programme momentum, ensuring that it reaches all the people of Angul. The Jaanch committee has a number of responsibilities to fulfil, he explains: to ensure that the children on Angul are leading healthy and quality life, to ensure that they get access to healthy hot cooked meals, and to ensure that they all are registered with the anganwadi centres. "The committee consists of nine members, including anganwadi member, and also people who are the beneficiaries," Mohanty adds.

The committee members are pivotal in eradicating malnourishment. They have a huge role to play in ensuring that the ICDS services reach the children in a smooth way. "As members of the Jaanch, we conduct meetings to monitor proper development of children. We look into the quality and quantity of food being served," says. Antaryami Raul, who heads the Jaanch committee.

Anita Sahoo, another active member of the Jaanch committee says, "We ensure that the children get different food items, including sweets, such as laddoos, to eat, but whatever they get should provide them with nutrition."

Strategies adopted

·**Meetings headed by the sarpanch:** AAPA encouraged sarpanch-headed meetings, to bring the issue of malnutrition into the community's notice and elicit political response. The sarpanch actively organised meetings in their respective gram panchayats with the support of AAPA members. The objective was to create awareness on the services provided by ICDS to poor children, who did not get access earlier.

·**Knowing the grievance:** Addressing the grievances of beneficiaries, pertaining to the ICDS service, was a major concern. Therefore, meetings were held for the members of Jaanch and Maatru committees, as well as Anganwadi workers. Beneficiaries were also invited to express their troubles in getting access to services.

·**Training committee members:** The members of the pivotal committees were imparted proper training, to make them capable of effectively monitoring the ICDS services, and taking adequate actions in response to problems faced by the beneficiaries in availing the ICDS services.

·**Ensuring transparency:** The ICDS guidelines emphasise the need to display names and photographs at anganwadi centres, so that the community members would have information about who to approach. This was not the case earlier. Therefore AAPA decided to introduce transparency in the system by encouraging the policy of putting up of names and photographs of Jaanch committee and

Maatru committee members. Until now, AAPA has been successful in spreading transparency in about 91 centres.

Removing the roadblocks

AAPA has been largely successful in its mission across the district through a number of innovative measures. The Nandpur village of Angul block is one such example, reflecting AAPA's successful intervention in providing the beneficiaries the right amount of eggs under Supplementary Nutrition Program (SNP), one of the six services offered under ICDS. It has ensured that the children, including pregnant mothers in Nandpur, received the required amount of eggs, keeping in view that they get nourishment. The beneficiaries before the intervention used to get only 10 eggs a month, under the Take Home Ration scheme (THR), and three eggs under the Hot Cooked Meal scheme. AAPA's intervention, helped all the 60 beneficiaries of the village in getting access to 12 eggs under THR and HCM schemes respectively.

Odisha is one of the few states to provide eggs to combat under-nutrition, along with Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Jharkhand, Bihar, Tripura and West Bengal. In the Suabasasahi village of Pallahara block in the district, around 20 beneficiaries earlier were not getting access to HCM, as anganwadi centres were located far away. The AAPA team collaborated with the Self –Help Groups (SHGs) in the area to provide HCM to the people.

A mission nearly accomplished

With the collective efforts of the people, the committee members, and the anganwadi workers, Angul has by far achieved its goal in few areas. It, however, is still striving its way to eradicate malnourishment in other areas as well through innovative methods and community inputs. District Collector of Angul, Manoj Kumar Mohanty, has sent a proposal to the Government for more anganwadi centres to operate in other inaccessible areas of the district and is making efforts to come up with better strategies to spread awareness on undernutrition. The point is to encourage people of Angul to participate in collectively removing malnutrition, he explains.

Angul is on its to becoming the nutrition champion of Odisha. A sterling example that with the right kind of interventions and methods each village across the country can become another Angul.

11. Row over adopting fathers surname in meghalaya

The Khasi Hills Autonomous District Council (KHADC) defended its decision as a move to preserve its jurisdiction's unique matrilineal customs.

Opposition politicians and men's rights activists in Meghalaya have denounced an order by the Khasi Hills Autonomous District Council (KHADC) to refuse Scheduled Tribe (ST) status to people who adopt their husband's or father's surname.Titosstarwell Chyne, the KHADC's chief executive member, told *The Hindu* that the order was given to preserve the Khasi society's matrilineal customs and was in line with local laws.

In Khasi culture, children take their mothers' surnames, men move in with their wives, and the youngest daughters in a family inherit their parents' homes.

But detractors say that these customs are exclusionary and demoralising.

"I will fight for my children if there is an attempt to take away their right of being called Khasis," a Meghalaya legislator from the Voice of the People Party (VPP) said, adding that his children use his surname in contrast to Khasi norms."Why can they not be considered Khasi when my wife and I are Khasis?" he was reported saying by *The Hindu*.

Keith Pariat, a former leader of the men's rights group Syngkhong Rympei Thymmai, told a *BBC News* reporter that Khasi culture often reflects sexist assumptions.

"A tree is masculine, but when it is turned into wood, it becomes feminine … the same is true of many of the nouns in our language. When something becomes useful, its gender becomes female," he said.

The KHADC has made attempts in the past to enforce the Khasi community's matrilineal rules. In November 2021, the council tabled a Bill which proposed that women and children who adopt their husband's or father's customs should be deprived of their inheritance rights."We have women living abroad, who have adopted their husbands' customs, but who still own their families' property instead of their brothers living here. Why shouldn't that change?" Chyne said in defence of the Bill for an *Open the Magazine* feature in 2021

In fact, the Khasi Hills Autonomous District Khasi Social Custom of Lineage Act, 1997 also says that in order for someone to legally belong to their mother's Khasi clan, they or their mother cannot adopt the "personal laws" of their non-Khasi father (or husband).

Despite the KHADC's enforcement of these norms, some women's rights groups have expressed their concern that Khasi culture is actually a "patriarchal society in disguise." In the *Open* feature, an activist named Joy Grace Syiem said that the lack of women in positions of power and government is evidence for the patriarchy in Khasi culture.

Meanwhile, in an interview to *The Meghalayan* on May 16, Chyne said that the KHADC was in the process of seeking the Meghalaya government's permission to authorise ST certification themselves.ST is a protected category in India which, among other things, affords reservations in educational institutes, government jobs and legislatures to its members.

12. Home gardens are key to better lives for vulnerable tribes in India, finds research

The forested hills and rolling fields in the state of Odisha are home to some of India's most vulnerable tribal groups, but a growing number of studies show that small home gardens—producing millet, pulses, fresh fruits and vegetables—could be key in the fight against the food insecurity, malnutrition and poverty found there.

In 2020, 828 million people globally went hungry and almost 3.1 billion people coul d not afford a healthy diet, according to World Health Organization (WHO) statistics.

Despite India now being a middle-income country, it continues to struggle with food security, malnutrition, and rising levels of anemia among women and children.

In recent years, there have been a growing number of studies about how home gardens—which, as the name suggests, are fruits, vegetables, or grains grown at a household scale—might help fight hunger, but there has been limited field evidence of their effects on food security, dietary quality, and incomes. In a new paper, "Home gardens, household nutrition and income in rural farm households in Odisha, India," published in the *Journal of Agricultural Economics* researchers from the Alliance of Bioversity International and CIAT looked at about 1,900 households in tribal communities in the state of Odisha, India and produced solid evidence that home gardens can improve food security, dietary quality, and income in these rural farming communities.

Better food security

Sylvester Ogutu, a researcher for the Alliance of Bioversity International and CIAT and the paper's lead author, said that having a home garden increased annual home-produced food by nearly 90 percent.

"Our findings also suggest that home gardens can be a poverty-reducing strategy for resource-poor farmers and vulnerable population groups," Ogutu said, adding that the monthly value of home-produced and consumed food per adult rose by over half, increasing the probability of greater food security among adopters of home gardens.

"Having a home garden also increased monthly per adult equivalent incomes by 37% and reduced the prevalence of poverty by 11.7 percentage points," he said.

A bright future for home gardens

Jonathan Mockshell, an agricultural economist at the Alliance of Bioversity International and CIAT, study lead, and a co-author of the paper, said that programs aimed at teaching vulnerable population groups how to start or improve home gardens started in Odisha in 2017 and are ramping up, with three quarters of the home garden interventions completed between 2020 and 2021.

"Home gardens can also complement government programs, such as the National Nutrition Mission, to improve nutrition and also contribute toward achievement of the Sustainable Development Goals, especially those related to poverty, zero hunger, and good health and well-being," Mockshell said.

"Promotion of home gardens in India can help curb widespread malnutrition problems, such as anemia in women, by improving the quality of diets that are typically less diverse, dominated by cereals, and/or characterized by low intakes of fruits and vegetables," James Garrett, a co-author, said.

An Indian government program aims to reach over 27,300 beneficiaries with home garden interventions to help increase their production and consumption of highly nutritious home-produced foods, and ultimately improve their food and nutrition security by improving the quality of their diet.

This latest paper is part of a wider push at the Alliance of Bioversity International and CIAT, and the One CGIAR Initiative on National Policies and Strategies to link research evidence on the benefits of home gardens to policy making to contribute to transitioning to resilient food systems.