



PIB, THE HINDU Newspaper and Editorial Current Affairs

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PIB

Quick Reach Surface-to-Air missiles (QRSAM)

Why in news?

Recently Defence Research and Development Organisation (DRDO) successfully test fired indigenously developed Quick Reach Surface-to-Air missiles (QRSAM) from ITR Chandipur, off the Odisha.

Highlights:

- The missile is developed by the Defence Research and Development Organisation (DRDO) in association with Bharat Electronics Limited and Bharat Dynamics Limited for the India Army.
- the missile is an all-weather, all-terrain missile equipped with electronic measures to counter jamming by aircraft radars, and is also capable of tracking.
- QRSAM has a range of 25-30 km and uses solid-fuel propellant. The first test firing of the missile took place on 4 June 2017, and this was followed by a second successful test on 3 July 2017.
- **The missiles were fired from a canister mounted on a rotatable truck-based launch unit.**

Agri Export Policy

Why in news?

Union Minister of Commerce and Industry held an interaction with Farmer Producers' Organizations (FPOs) through video link in 81 locations of the country in New Delhi.

About Agri Export Policy:

- The Government has come out with a policy to double farmers' income by 2022. Exports of agricultural products would play a pivotal role in achieving this goal.
- In order to provide an impetus to agricultural exports, the Government has come out with a comprehensive "Agriculture Export Policy" aimed at doubling the agricultural exports and integrating Indian farmers and agricultural products with
- the global value chains.

Vision:

Harness export potential of Indian agriculture, through suitable policy instruments, to make India global power in agriculture and raise farmers' income.

Objectives:

Objectives of the Agriculture Export Policy are as under:

- To double agricultural exports from present ~US\$ 30+ Billion to ~US\$ 60+ Billion by 2022 and reach US\$ 100 Billion in the next few years thereafter, with a stable trade policy regime.
- To diversify our export basket, destinations and boost high value and

value added agricultural exports including focus on perishables.

- To promote novel, indigenous, organic, ethnic, traditional and non-traditional Agri products exports.
- To provide an institutional mechanism for pursuing market access, tackling barriers and deal with sanitary and phyto-sanitary issues.
- To strive to double India's share in world agri exports by integrating with global value chain at the earliest.
- Enable farmers to get benefit of export opportunities in overseas market.

About Farmer Producers' Organizations:

A Producer Organisation (PO) is a legal entity formed by primary producers, viz. farmers, milk producers, fishermen, weavers, rural artisans, craftsmen. A PO can be a producer company,

a cooperative society or any other legal form which provides for sharing of profits/benefits among the members. In some forms like producer companies, institutions of primary producers can also become member of PO.

FPOs:

It is one type of PO where the members are farmers. Small Farmers' Agribusiness Consortium (SFAC) is providing support for promotion of FPOs. PO is a generic name for an organization of producers of any produce, e.g., agricultural, non-farm products, artisan products, etc.

Essential features of a PO:

- a. It is formed by a group of producers for either farm or non-farm activities.
- b. It is a registered body and a legal entity.
- c. Producers are shareholders in the organization.
- d. It deals with business activities related to the primary

produce/product.

e. It works for the benefit of the member producers.

f. A part of the profit is shared amongst the producers.

g. Rest of the surplus is added to its owned funds for business expansion.

Equipment Type Approval (ETA)

Why in news?

DoT has issued instructions liberalising import norms for prototype, sample products and test & measurement equipment in license exempt bands without the need of 'Equipment Type Approval (ETA)'.

Highlights:

- The devices with radio-interfaces include laptops, notebooks, smart accessories, short range devices, Cameras, Scanners, Printers and mobile handsets.
- In addition, the DoT also has enabled ETA through self-certification in its step forward for commercial / finished product imports under the above categories, simplifying regulatory regime while ensuring compliance as well as reducing transaction costs. These measures will enhance ease of doing business in the regulation of consumer wireless products and reduce timelines for clearances.
- Equipment Type Approval from DoT has been one of the prerequisites for importing products operating in license exempt bands.
- It is important to mention that the National Frequency Allocation Plan 2018 has taken a radical step in enhancing the license exempt spectrum in 5 GHz band to 605 MHz to trigger enhanced deployment of Wi-Fi services, consumer products and short range devices for various applications in license exempt bands.

About National Digital Communication Policy 2018:

- The new telecom policy has been formulated in place of the existing National Telecom Policy-2012 and aims to facilitate India's effective participation in the global digital economy.
- The policy aims to ensure digital sovereignty and the objectives are to be achieved by 2022. Under the new telecom policy, the government aims to provide universal broadband connectivity at 50 Mbps to every citizen. It has kept a target of providing 1 Gbps connectivity to all Gram Panchayats by 2020 and 10 Gbps by 2022.

Background:

As the present world has entered the era of modern technological advancements in the Telecom Sector such as 5G, IoT, M2M etc., a need was being felt to introduce a 'customer focused' and 'application driven' policy for the Indian Telecom Sector, which can form the main pillar of Digital India by addressing emerging opportunities for expanding not only the availability of telecom services but also telecom based services.

Objectives:

The key objectives of the policy are:

- Broadband for all;
- Creating four million additional jobs in the Digital Communications sector;
- Enhancing the contribution of the Digital Communications sector to 8% of India's GDP from ~ 6% in 2017;
- Propelling India to the Top 50 Nations in the ICT Development Index of ITU from 134 in 2017;
- Enhancing India's contribution to Global Value Chains; and
- Ensuring Digital Sovereignty.

These objectives are to be achieved by 2022.

Features:

The policy aims to

- Provide universal broadband connectivity at 50 Mbps to every citizen;
- Provide 1 Gbps connectivity to all Gram Panchayats by 2020 and 10 Gbps by 2022;
- Ensure connectivity to all uncovered areas;
- Attract investments of USD 100 billion in the Digital Communications Sector;
- Train one million manpower for building New Age Skill;
- Expand IoT ecosystem to 5 billion connected devices;
- Establish a comprehensive data protection regime for digital communications that safeguards the privacy, autonomy and choice of individuals
- Facilitate India's effective participation in the global digital economy;
- Enforce accountability through appropriate institutional mechanisms to assure citizens of safe and
- Secure digital communications infrastructure and services.

Strategy:

The policy advocates:-

- Establishment of a National Digital Grid by creating a National Fibre Authority;
- Establishing Common Service Ducts and utility corridors in all new city and highway road projects;
- Creating a collaborative institutional mechanism between Centre, States and Local Bodies for Common Rights of Way,
- standardization of costs and timelines;
- Removal of barriers to approvals; and
- Facilitating development of Open Access Next Generation Networks.

Sampriti-2019

Why in news?

As part of the ongoing India Bangladesh defence cooperation, a joint military exercise Sampriti-2019 will be conducted at Tangail, Bangladesh from 02 March to 15 March 2019.

Highlights:

- Exercise Sampriti-2019 is an important bilateral defence cooperation endeavour between India and Bangladesh and this will be the eighth edition of the exercise which is hosted alternately by both countries.
 - The exercise is aimed to strengthen and broaden the aspects of interoperability and cooperation between the Indian and Bangladesh Armies.
 - The exercise will involve tactical level operations in a counter insurgency and counter terrorism environment under the UN mandate.
 - In addition to understanding each other in tactical level operations, emphasis will also be laid for greater cultural understanding to strengthen military trust and cooperation between the two nations.
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THE HINDU

India Air strikes at Jaish camp in Pakistan's Balakot:

Why in news?

Twelve days after the Pulwama attack, the Indian Air Force bombed the Jaish-e-Mohammad's "biggest" terror-training camp in Pakistan's Balakot.

Location:

- The operation was carried out by 12 Mirage-2000 fighter jets, which

unleashed five one-tonne bombs on the camp, based 70 km inside the Line of Control (LoC), in the Pakistani province of **Khyber Pakhtunkhwa**.

- Senior officials citing intelligence inputs said the JeM facility was particularly crowded with 200-325 militants as many had abandoned launch pads and training camps closer to the LoC after the Pulwama attack in the expectation that India would not target Balakot.

Major shift:

- The aerial attack on a target inside Pakistani territory marks a major shift in India's counter-terror responses, which have thus far been restricted to **ground operations** across the LoC in Pakistan-occupied Kashmir.
- Defence officials said the **Mirage fighters took off from the Gwalior airbase** at approximately 3 a.m., backed by aircraft from other bases, including Sirsa, Bathinda and Agra.

Indian Government statement:

- Announcing the strikes, the government said it was a “**non-military, pre-emptive**” **counter-terror operation** against imminent threats from the JeM.
- Credible intelligence was received that the JeM would attempt another suicide terror attack, and jihadis were being trained for this purpose. In the face of imminent danger, a pre-emptive strike became absolutely necessary,” Foreign Secretary Vijay Gokhale said.
- A very large number of JeM terrorists, trainers, senior commanders and groups of jihadis, who were being trained for *fidayeen* action, were eliminated in the operation.
- Later in the day, External Affairs Minister Sushma Swaraj met with foreign diplomats and spoke to Foreign Ministers of U.S., China, Singapore, Bangladesh and Afghanistan, briefing them about the operation.
- EAM stressed the point that India had only conducted a counter-terror strike on a training camp in Pakistan, and did not wish to “escalate” the situation further.

Pakistan Response:

- The first word on the attacks came not from the government, but from

the Pakistani military spokesperson, who denied any “casualties or damage” from the operation.

- Pakistani military spokesperson tweeted that IAF jets had violated the LoC and “released a payload (munitions) while escaping” after being confronted by Pakistani Air Force planes scrambled to repel the incursion.
- It is India’s turn now to wait for our response, it will come as a surprise,” Major-General Ghafoor warned at a press conference later.

Why Balakot:

- Hundreds of Fidayeen and their trainers were shifted from Pakistan Occupied Kashmir to a five-star, resort style camp in a hilltop forest in Balakot after the Pulwama attack, providing Indian forces with “**a sitting duck target**” when they carried out an air strike early Tuesday, killing up to 350 terrorists.
- At least 325 terrorists and 25 to 27 trainers were at the camp, the biggest operated by the Pakistan-based Jaish-e-Mohammad group, which had claimed responsibility for the February 14 suicide attack on a CRPF convoy in Pulwama, Kashmir that killed 40 jawans.
- Everyone at the camp was sleeping and Pakistani defence establishment had no clue that the attack was coming so deep into their country because they had expected a surgical strike on camps in Pakistan Occupied Kashmir near the Line of Control.
- But India received intelligence that JeM had shifted many in-training terrorists and hardcore operatives, along with their trainers, to the Balakot camp, which has facilities for 500 to 700 people, and even has a swimming pool along with cooks and cleaners.
- The terror camp is located 20 km from Balakot town. Balakot is some 80 km from the Line of Control near **Abbotabad** where Al-Qaeda leader Osama bin Laden was killed in hiding by covert U.S. forces who had also sneaked into Pakistan to carry out the operation, catching the entire Pakistani military unawares.

The Operation:

- 12 Mirage-2000 combat jets of the Indian Air Force (IAF) armed with **Israeli Precision Guided Munitions** (PGM) took off from their Gwalior airbase on a crucial mission, cloaked in secrecy.
- Twelve Mirage-2000 jets from Gwalior were involved in the strike and

they carried **SPICE 2000 and Crystal Maze Mk2**, also called AGM 142 Popeye PGMs.

- SPICE stands for 'Smart, Precise Impact and Cost-Effective' a kit which converts a conventional bomb into a smart munition and is manufactured by **Rafael of Israel**. The '2000' refers to a bomb of 2,000 pounds (about 1,000 kg).
- The PGMs enable the aircraft to release them from stand-off distances while staying away from harm's way and the munitions glide to the target once launched. Defence sources said five 1,000 kg PGMs were dropped in the strike.
- The IAF also deployed the **Israeli Phalcon and indigenous Netra early warning aircraft to monitor the mission** to direct the aircraft as well as to keep an eye out for Pakistani F-16s that might be deployed to counter them and a **Heron long range UAV that was used for monitoring and assessment**. Sukhoi Su-30MKIs fighter jets were also airborne and standing by, as a precautionary move.
- To avoid preparations from leaking out, the Mirages flew directly from their home base in Gwalior at the time of the mission to the target area and back.
- The Mirages used the **Israeli Litening targeting pods** to mark the targets and the PGMs were launched from a safe distance.
- The initial Battle Damage Assessment (BDA) was that the hit was 100% and that all aircraft had returned safely. Further details from the assessment are awaited.
- The use of air power is significant as it is the first time since the 1971 war that the IAF crossed over and struck inside Pakistani territory. Even during the Kargil conflict, the IAF was under strict instructions to not cross the LoC.

3 banks out of prompt corrective action framework:

Why in news?

Three more banks Allahabad Bank and Corporation Bank, from the public sector, and Dhanlaxmi Bank from the private sector are now out of the Reserve Bank of India's (RBI) prompt and corrective action (PCA)

framework.

Six more under PCA

- There are another six banks that are still under PCA framework.
- While lifting the restrictions on the State-run lenders, RBI said the **Board for Financial Supervision** (BFS) reviewed the performance of the banks under PCA and noted that these two banks had received capital infusion from the government.
- Capital infusion has shored up their capital funds and also increased their loan loss provision to ensure that the PCA parameters were complied with
- Allahabad Bank and Corporation Bank had received capital of ₹6,896 crore and ₹9,086 crore respectively.

Capital adequacy ratio

- As on December 31, Allahabad Bank had a capital adequacy ratio of 10.42% and net NPA ratio of 7.7%, while Corporation Bank's CAR was at 11.12% and net NPA 11.47%.
- The two banks have also made the necessary disclosures to the stock exchange that post infusion of capital, the **CRAR, CET1, Net NPA and leverage ratios** are no longer in breach of the PCA thresholds.
- According to norms, **PCA framework gets triggered when a bank breaches one of the three risk thresholds. Crossing 6% net NPA is one of them.**
- RBI will continuously monitor the performance of these banks under various parameters.

Prompt Corrective Action:

- Prompt Corrective Action or PCA is a framework under which **banks with weak financial metrics are put under watch by the RBI.**
- The PCA framework deems banks as risky if they slip below certain norms on **three parameters capital ratios, asset quality and profitability.**
- It has **three risk threshold levels** (1 being the lowest and 3 the highest) based on where a bank stands on these ratios.
- Banks with a capital to risk-weighted assets ratio (CRAR) of less than 10.25 per cent but more than 7.75 per cent fall under threshold 1.

- Those with CRAR of more than 6.25 per cent but less than 7.75 per cent fall in the second threshold.
 - In case a bank's common equity Tier 1 (the bare minimum capital under CRAR) falls below 3.625 per cent, it gets categorised under the third threshold level.
 - Banks that have a net NPA of 6 per cent or more but less than 9 per cent fall under threshold 1, and those with 12 per cent or more fall under the third threshold level.
 - On profitability, banks with **negative return on assets for two, three and four consecutive years** fall under threshold 1, threshold 2 and threshold 3, respectively.
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Angkor Thom

Why in news?

Angkor, the ancient capital of the **Khmer empire**, appears to have suffered a gradual decline rather than a catastrophic collapse, according to a study published.

Findings:

- Archaeologists and historians have long sought to explain the **15th-century abandonment of Angkor**, with many attributing it to the 1431 invasion by Thai forces from Ayutthaya.
- The historical record is effectively blank for the 15th century at Angkor.

Sediment cores tested:

- There is nothing written record that tells us why they left or when or how. Everything that survived is carved on stone.
- For the study, the team examined 70-cm sediment cores taken from a moat that surrounded Angkor Thom, the capital of the Khmer empire.
- The cores serve as a "natural history book recording changes in land use, and climate, and in vegetation, year after year."
- Where humans live, they leave traces through fire, soil erosion through agriculture and disturbed vegetation. When they leave,

conditions change.

- In the first decades of the 14th century, there starts decline in land use, wood burning, destabilised vegetation and a reduction in soil erosion.
- By the end of the 14th century, “the southern moat of Angkor Thom was overgrown with vegetation, and management, by implication, had ceased.

Angkor Thom:

- Angkor Thom is an almost square city surrounded by 8-meter-high walls a little over 12 kilometres long with five impressive gopura gates providing access to the city. The city’s name translates to “large city” or “great city”.
 - King Jayaraman VII made Angkor Thom the new capital of the Khmer Kingdom after driving out the Chams, who destroyed the old capital Yasodharapura. He fortified the city by building a high wall around it, in turn enclosed by a 100-meter-wide moat.
 - King Jayavarman VII built his state temple, the Bayon, at the center of the city. Just to the North he built his Royal Palace. Since it was built of perishable materials, nothing of it remains today except for the Royal Terraces that were made of stone.
 - The Elephant terrace and the Leper King terrace formed the Eastern boundary of the Palace enclosure. The city was inhabited by tens of thousands of common people who lived in wooden houses, that have long gone. The city was highly developed with a system of roads and waterways, as well as four hospitals.
 - After the Khmer Kingdom went into decline, the city was at one point deserted and left to the jungle. In the 19th century, the site was rediscovered by French explorers, soon after which the EFEO (the École Française d'Extrême-Orient) began clearing works and restoration of the monuments overgrown by thick jungle.
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Declaring 5 year I-T returns a must for poll candidates:

Why in news?

The Central government issued a notification making it mandatory for candidates to declare total income as shown in their Income-Tax Returns (ITR) for the last five years, and that of their spouses, dependents and the Hindu Undivided Family (HUF), as recommended by the Election Commission.

New Rules:

- The notification states that changes have been made to the **Form-26 affidavit**, which is submitted with the nomination paper, in consultation with the Election Commission. From now on, candidates will also have to **provide their Permanent Account Number (PAN)**.
- Details to be shared should also include the interest in or ownership of **offshore assets**, including all deposits or investments in foreign banks and any other body or institution abroad, and details of all assets and liabilities in foreign countries, held by the candidates, their spouses, dependents and HUFs.
- The Commission had suggested the changes following a recent meeting with the Central Board of Direct Taxes (CBDT) on various issues, including the recommendation for making public the income verification report of the candidates.
- After the ITR papers become part of the affidavit, the information will be in the public domain.
- Since 2013, the Income-Tax Department has been verifying the asset declaration made by candidates in their affidavits. However, the verification reports were not being made public.
- While the CBDT earlier had reservations over making the report public in view of Section 138 of the Income-Tax Act, the Election Commission (EC) was of the opinion that it was different from an investigation report.

Chagos archipelago

Why in news?

The stunning opinion of the **International Court of Justice in The Hague**, that Britain's continued administration of the **Chagos archipelago** is unlawful, is a landmark in the effort to decolonise the

Indian Ocean and **return the islands to Mauritius.**

Briton's Possession:

- Britain's reaction, however, was predictable and disappointing. It said the ICJ's is an advisory opinion it will examine, and stressed the security significance of the islands.
- Since the **late-1960s, the U.S. has maintained a military base on one of them, Diego Garcia.**
- In 2016, Britain extended the lease to the U.S. till 2036 even as it said it would return the islands to Mauritius when no longer needed for defence purposes.
- Mauritius has made it clear that it does not intend to jeopardise the future of the military base.
- The **agreement to allow Britain to administer the Chagos islands came in 1965**, three years before Mauritius gained independence.
- Mauritius says Britain had made it a pre-condition for independence.
- This was endorsed by the ICJ, which noted that given the imbalance between the two, the agreement did not amount to "freely expressed and genuine will".
- It is a damning assessment of colonial legacies and the attempt by former colonial powers to justify or ignore the indefensible on the basis of 'agreements'.

Briton's hard efforts:

- Britain has tried to block Mauritius's claim to the islands at every stage, first by attempting to defeat a UN General Assembly vote in 2017 calling on the ICJ to deliver its opinion.
- When it lost this, London questioned the court's jurisdiction and Mauritius's version of how the deal had been thrashed out.
- However, **Mauritius has had many countries on its side, including India.**
- In written and oral submissions before the court, **India has insisted that historical facts were not with Britain's interpretation** and that its continued administration of the islands meant the process of decolonisation had not been completed.
- In an ideal world, Britain would be compelled to hand the islands to Mauritius.

- However, as the opinion against the construction of the separation wall in the Occupied Palestinian Territory in 2003 demonstrates, ICJ advisories are not always acted on.
 - At the very least, Britain should show it respects the court's view and Mauritius's sovereignty, and make significant concessions starting with matters ranging from fishing rights to compensation for the Chagossians, who have suffered through all of this.
 - The ICJ 'opinion' draws the line on what is expected from Britain for it to be a global nation in tune with the new world order. It announces that the world has moved on from passive acceptance of the injustices of empire.
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Period. End of Sentence

Why in news?

A group of women from Khatikhera, Hapur in UP, manufacture sanitary napkins at a small set-up in a member's house. A film based on them, Period. End of Sentence., which deals with the stigma attached to menstruation, has won an Oscar award. However, the two girls, part of the face of a revolution in Khatikhera village.

Not enough money:

- Father of 2-member girls is very proud of his daughters and greets visitors conveying wishes with a wide smile. He could not build a toilet because money is short.
- The floor needs to be dug out and it demands money. The government gives money for building toilets but the Gram Pradhan dodges us.
- Everyone in their family used the makeshift toilet in the next street, as did many other residents of the village.
- Many of the villagers don't have toilets in their house. When asked how they managed, women directed to makeshift open toilets in empty plots where they relieved themselves.

Hardships and Taboos:

- Recalling the beginning of their journey, the women said they faced objections, were mocked at and made fun of, and had to lie and put up a fight to be able to run the manufacturing unit.
 - The villagers also objected to “being so open about periods.” “Initially, the women would shut doors on them and say that only while had the guts to talk about this, they didn’t spare them. The men would also make nasty statements behind their back.
 - The women remembered how, when the movie was being shot, they were hesitant to come in front of the camera, and how they were mocked.
 - Of the seven women, one member dropped out of school because of menstruation because her school neither had a toilet nor a female teacher.
 - The manufacturing unit has given the women wings to ‘Fly’ the brand. But they still don’t feel “fully liberated”. “Our life is still about work and home. We don’t go to cities and are not allowed to do so alone. Things are changing slowly,” they say.
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Disclosing Political funding and expenditure details

Why in news?

The Delhi High Court sought the stand of the Election Commission of India (EC) on taking action against political parties, which do not comply with its instructions to disclose funding and expenditure details.

Discussions in details:

- The EC told the Bench that it has been consistently writing to the parties, which have not disclosed their expenditure.
- The High Court directed the EC to file an affidavit indicating what powers or options it has to ensure implementation or enforcement of its guidelines regarding disclosure of expenditure by political parties and what steps it can take when there is violation of its norms.

- The High Court was hearing a petition by NGO Association for Democratic Reforms (ADR) seeking implementation of the guidelines as well as the Law Commission's recommendation that a provision be enacted to monitor and regulate the expenditure by political parties during elections.
 - The NGO has alleged in its plea that since the present political system was being "**funded through various illegal means and also by the people and corporate agencies with vested interests**, it [political system] does not seem to be inclined to give effect to the recommendations of the Law Commission.
 - The Supreme Court has held that the EC has the power to give effect to the law panel's recommendations.
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Gynandromorph

Why in news?

All serious butterfly collectors remember their **first gynandromorph: a butterfly with a colour and pattern that are distinctly male on one wing and female on the other.**

Findings of the study:

- The patterning on the gynandromorph's wing shows that the body uses signalling centres to control where cells go during development and what tissues they become in creatures as diverse as butterflies and people.
- Gynandromorph butterflies and other half-male, half-female creatures, particularly birds, have fascinated both scientists and amateurs for centuries.
- Scientists say these instances of **split-sex animals and insects** could offer clues to why some human diseases strike one sex more than the other.
- Researchers thought they had figured out the genetics of birds and bees, but gynandromorphs suggest that there is more to learn.
- **Mammals have X and Y chromosomes, birds and insects have Z**

and W, and some reptiles can change their sex depending on temperature, or a combination of temperature and sex chromosomes.

Proteins at work:

- It was believed that the **sex of a bird was determined by a protein made by the DMRT1 gene**, which would reach all the cells of the bird through the bloodstream. But for two sides of the bird to share the same bloodstream but not the same sex, there must be more to the story.
- Hormones cannot be the sole drivers of sex either, but they most likely play some role.
- In a paper published in 2003 in PNAS , Mr. Arnold showed that in gynandromorphic zebra finches, brain cells on the female side were more masculine than comparable cells in a typical female.
- How gynandromorphs are born at all **still remains a mystery**. For birds, the most likely explanation is that a female makes an unusual double-nucleus egg cell, one with a Z chromosome and one with a W chromosome, and each is fertilized by a Z sperm, making some cells ZZ and others ZW in the same individual.
- The **same process is very unlikely to happen in mammals**. Female mammals naturally have two of the same sex chromosomes, and the instant a mammalian egg and sperm fuse, “dramatic changes prevent the entry of a second sperm.”
- Gynandromorphs occur naturally, usually resulting from a random genetic error.

Impact of sex genes on human diseases:

- Research on sex genes has implications for treating human diseases that seem to vary by gender.
- In multiple sclerosis, a genetically female mouse with two X chromosomes fares worse than a mouse with an X and a Y, even if they have the same hormones.
- Understanding why females fare worse could help explain MS in people, where there is also a gender difference, with women accounting for three times as many cases as men.
- **Obesity, metabolic syndrome, autoimmune disease, Alzheimer's, even ageing differs by sex**. Twenty years ago, scientists did not think that sex chromosomes played any role in

causing sex differences in these diseases. But now it is known it makes a difference in mice, so we can say: Where does it make a difference in humans.



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