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Budget Series #13

Kisan Drones

(Ministry of Agriculture and Farmers Welfare)

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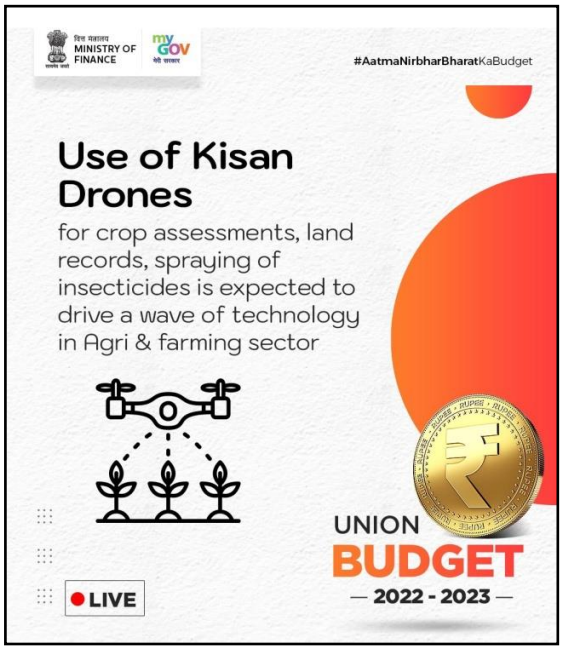
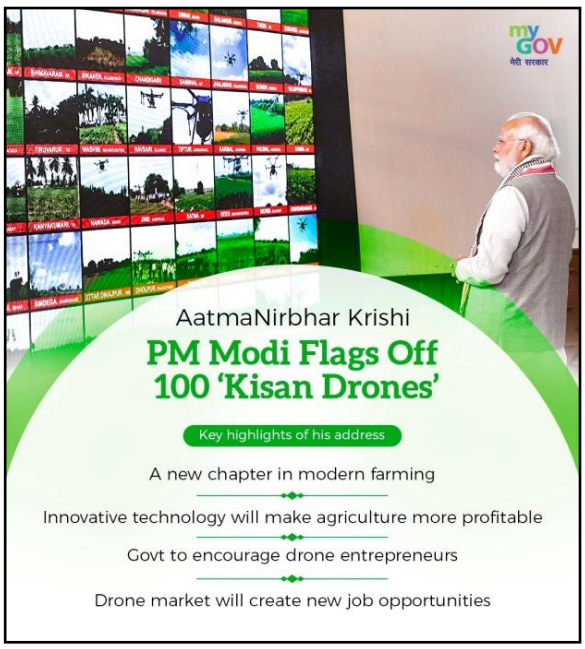
"Glad to have witnessed Kisan Drones in action at 100 places across the country. This is a commendable initiative by a vibrant start-up, @garuda_india. Innovative technology will empower our farmers and make agriculture more profitable."

- Prime Minister Narendra Modi

Budget Announcement[1]: Promoting Kisan Drones

While highlighting the use of new technology, the **Union Finance Minister in her budget speech 2022-23** said that the **use of 'Kisan Drones' will be promoted** for crop assessment, digitization of land records, spraying of insecticides, and nutrients.





On 19 February 2022, **Prime Minister Narendra Modi launched Kisan Drones at 100 places** across the country. Speaking at the occasion, the Prime Minister said that until a few

[1] https://pib.gov.in/PressReleasePage.aspx?PRID=1794146

years back, a drone was considered to be a technology related to the Army, or a device used to combat enemies, thus limiting our thought to that particular use. With the inauguration of Kisan drone facilities in Manesar, India was marking a new chapter in the direction of modern farming system of the 21st century.[2]

While addressing a webinar on positive impact of Union Budget 2022 in Agriculture sector, the Prime Minister stressed that Artificial Intelligence is going to completely change the trend related to agriculture and farming in the 21st century. Increasing use of drones in farming is part of this change. "Drone technology will be available on a scale only when we promote agri-startups. **In the last three-four years, more than 700 Agri Start-ups** have been created in the country" he added.[3]

Background[4]

In 2016, The Indian Council of Agricultural Research (ICAR) through the Indian Agricultural Research Institute (IARI) formulated a collaborative research project entitled "**SENSAGRI: SENsor based Smart AGRIculture**" involving six partner Institutes (Agriculture & IT) to be funded by Information Technology Research Academy (ITRA), Department of Electronics and Information Technology (DEITY), Ministry of Communication and Information Technology (MCIT), Government of India and ICAR. The major objective was to develop indigenous prototype for drone-based crop and soil health monitoring system using hyper spectral remote sensing (HRS) sensors. This technology could also be integrated with satellite-based technologies for large scale applications.

Drone technology based unmanned aerial vehicle (UAV) has ability for smooth scouting over farm fields, gathering precise information and transmitting the data on real time basis. This capability can be used for the benefit of farming sector at regional/local scale for assessing land and crop health; extent, type and severity of damage besides issuing forewarning, post-event management and settlement of compensation under crop insurance schemes.

Ministry of Civil Aviation notifies liberalised Drone Rules, 2021[5]

In March 2021, the Ministry of Civil Aviation (MoCA) published the Unmanned Aircraft System (UAS) Rules, 2021. They were perceived by academia, Start-ups, end-users and other

[2] https://pib.gov.in/PressReleasePage.aspx?PRID=1799531
[3] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1800859
[4] https://pib.gov.in/newsite/PrintRelease.aspx?relid=147238
[5] https://pib.gov.in/PressReleasePage.aspx?PRID=1749154

stakeholders as being restrictive in nature as they involved considerable paperwork, required permissions for every drone flight and very few "free to fly" green zones were available. Based on the feedback, the Government repealed the UAS Rules, 2021 and replaced the same with the liberalised Drone Rules, 2021.

To know more about the **Drone Rules, 2021**, click here.

Ministry of Agriculture & Farmers Welfare Granted Drone Use Permission[6]

The Ministry of Civil Aviation (MoCA) and Directorate General of Civil Aviation (DGCA) have granted conditional exemption for Remotely Piloted Aircraft System (RPAS) usage to the Ministry of Agriculture & Farmers Welfare (MoAFW), Government of India. The permission allows drone deployment by the MoAFW for remote sensing data collection in agricultural areas of 100 districts of the country, for Gram Panchayat level yield estimation, under Pradhan Mantri Fasal Bima Yojana (PMFBY).

To see the Conditions and limitations to Ministry of Agriculture & Farmers Welfare for operating Remotely Piloted Aircraft click here.[7]

Use of UAV (Drones) in Agriculture[8]:

The adoption of UAVs or drones offers immense potential to revolutionise Indian agriculture and ensure the country's food security.

[6] https://pib.gov.in/Pressreleaseshare.aspx?PRID=1699360
[7] https://pib.gov.in/Pressreleaseshare.aspx?PRID=1699360
[8] https://static.pib.gov.in/writereaddata/userfiles/sop_drone_application.pdf

Analysing soil and crop nutrient

An agricultural drone is used to help optimize agriculture operations, increase crop production, and monitor crop growth by assessing and mapping different nutrients and efficient spraying of soil/ crop nutrients.

Enabling more efficient nutrient assessment/mapping

- Soil nutrient mapping can be helpful for real-time site-specific nutrient management.
- Traditional methods of soil nutrient analysis give properties of the soil at sampled locations only, whereas use of UAV provides the properties of the entire field in short time.
- As use of UAV based soil nutrient analysis requires less time and is energy efficient, the application of deficient nutrient can be done on time and with precision to improve the yield significantly, saving of fertilizers and reducing soil pollution.
- Drones fly over the field and take high resolution pictures which can be directly sent to the cloud/software facilitating precise corrective measures in the form of prescription maps.
- The maps can then be uploaded on the farm equipment which will precisely regulate delivery of inputs (fertilizers) that would need to be applied in the field for crop growth.

Facilitating the spraying of soil/crop nutrients

- Both forms of essential soil/crop nutrient i.e. solid forms like powder, crystals, prills, granules, super-granules, briquettes, etc. and liquid forms like water soluble powders, liquid nutrients, nano-fertilizers, growth regulators, etc. whether organic or inorganic can be sprayed using drones.
- At least 10 times more area can be sprayed per day per drone as compared to the traditional knapsack sprayers.
- 80-90 per cent of water can be saved in comparison to traditional spraying methods (depending on the sprayer system of the drone).
- Different kinds of sprayer nozzles are available depending on the form and concentration of the nutrients to be applied.

Alleviating labour pressure on agricultural operations

Drones can significantly alleviate labour pressure on agricultural operations like applying fertilizers, while enhancing the crop coverage per day. This will save significant time. Farmers can use the time saved to carry out other activities. They will also be able to respond quickly to biotic challenges.

For more details click here.[9]

Promotion of Drone use in Agriculture[10]: Initiatives by the Government

- Ministry of Agriculture and Farmers Welfare issued guidelines to make drone technology affordable to the stakeholders of this sector. The guidelines of "Sub-Mission on Agricultural Mechanization" (SMAM) have been amended which envisages granting upto 100 per cent of the cost of agriculture drone or Rs. 10 lakh, whichever is less, as grant for purchase of drones by the Farm Machinery Training & Testing Institutes, ICAR institutes, Krishi Vigyan Kendras and State Agriculture Universities for taking up large scale demonstrations of this technology on the farmers' fields.

- The Farmer Producer Organizations (FPOs) would be eligible to receive grant up to 75 per cent of the cost of agriculture drone for its demonstrations on the farmers' fields.

- A contingency expenditure of Rs. 6000 per hectare would be provided to implementing agencies that do not want to purchase drones but will hire drones for demonstrations from Custom Hiring Centres (CHCs), Hi-tech Hubs, Drone Manufacturers and Start-Ups.

- The contingent expenditure to implementing agencies that purchase drones for drone demonstrations would be limited to Rs. 3000 per hectare. The financial assistance and grants would be available until March 31, 2023.

- In order to provide agricultural services through drone application, 40 per cent of the basic cost of drone and its attachments or Rs. 4 lakh, whichever is less, would be available as financial assistance for drone purchase by existing Custom Hiring Centres set up by Cooperative Society of Farmers, FPOs and Rural entrepreneurs.

- The new CHCs or the Hi-tech Hubs that will be established by the Cooperative Societies of Farmers, FPOs and Rural entrepreneurs with financial assistance from Sub-Mission on Agricultural Mechanization (SMAM), Rashtriya Krishi Vikas Yojana (RKVY) or any other Scheme can also include Drone as one of the machines along with other agricultural machines in their projects.

- Agriculture graduates establishing Custom Hiring Centers would be eligible to receive 50 per cent of the basic cost of drone and its attachments or up to Rs. 5 lakhs in grant

[9] https://static.pib.gov.in/writereaddata/userfiles/sop_drone_application.pdf
[10] https://pib.gov.in/PressReleasePage.aspx?PRID=1791783

support for drone purchases. Rural entrepreneurs should have passed class tenth examination or its equivalent from a recognized Board; and should have remote pilot license from Institute specified by the Director General of Civil Aviation (DGCA) or from any authorized remote pilot training organization.

Ministry of Civil Aviation urges Ministries to promote use of Drones[11]

Ministry of Civil Aviation has requested several Ministries including Ministry of Home Affairs (MHA) to encourage various entities under their administrative control to promote use of drones.

Drones offer tremendous benefits to almost all sectors of the economy like agriculture, medicine delivery, mining, infrastructure, surveillance, emergency response, transportation, geo-spatial mapping, defence and law enforcement etc.

As per Drone Rules, 2021, operation of drones in zones marked red and yellow on the drone airspace map zones requires permission from the Central Government and the Air Traffic Control (ATC) authority respectively. No permission is required to operate a drone in a green zone which is where most of the drone operations currently happen.

Sl. No.	Ministry	Illustrative drone applications
1.	Agriculture & Farmers Welfare	a. Crop and soil health monitoring b. Irrigation estimation and scheduling c. Requirement and efficacy assessment of fertilizer and pesticide spraying d. Anti-locust operations e. Crop output estimates f. River and canal erosion; restoration tracking g. Insurance claim surveys

To see the illustrative list of drone applications under different Union Ministries, click here.[12]

PLI Scheme for Drones and Drone Components[13]

[11] https://pib.gov.in/PressReleseDetail.aspx?PRID=1795134
[12] https://pib.gov.in/PressReleseDetail.aspx?PRID=1795134
[13] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1755157

- The Production-Linked Incentive (PLI) scheme comes as a follow-through of the liberalised Drone Rules, 2021 released by the Central Government on 25 August 2021. The PLI scheme and new drone rules are intended to catalyse growth in the upcoming drone sector.

- The drones and drone components manufacturing industry may see an **investment of over INR 5,000 crore** over the next three years.

- The **annual sales turnover** of the drone manufacturing industry may grow from INR 60 crore in 2020-21 folds to over **INR 900 crore in FY 2023-24**.

- The **drone manufacturing industry** is expected to **generate over 10,000 direct jobs** over the next three years.

- It is expected to grow to over INR 30,000 crore in next three years. The **drone services industry** is expected to generate **over five lakh jobs** in three years.

Incentives for Indian manufacturers of drone and drone components under PLI Scheme can be found **here.**

Video Links:

Narendra Modi : https://www.youtube.com/watch?v=yDmZR2MUY0U
Ministry of Information & Broadcasting https://www.youtube.com/watch?v=fqRImaV7DV4

Twitter Links:

Narendra Modi @narendramodi: Discussing ways in which the Budget will contribute to strengthening agriculture sector.

References:

1. PIB Press Release: English rendering of PM's speech during witnessing flight of 100 kisan Drones by Garuda Aerospace Dated 19 Feb 2022
2. PIB Press Release: Drone Based Agricultural Technology Dated 19 July 2016
3. https://static.pib.gov.in/writereaddata/userfiles/sop_drone_application.pdf
4. https://static.pib.gov.in/writereaddata/userfiles/sop_drone_application.pdf
5. PIB Press Release: Government to Promote Drone use in Agriculture Dated 22 Jan 2022
6. PIB Press Release: Ministry of Civil Aviation urges various ministries to promote use of drones Dated 03 Feb 2022
7. IBID
8. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1755157
9. PIB Press Release: Incentive for Indian manufacturers of drone and drone components under PLI Scheme Dated 09 Dec 2021
10. PIB Press Release: Ministry of Agriculture & Farmers Welfare Granted Drone Use Permission Dated 19 Feb 2021

Further Reading:

- Standard Operating Procedure (SOP) for use of Drone in Pesticide Application for Crop Protection and for spraying Soil and Crop Nutrients: https://static.pib.gov.in/WriteReadData/userfiles/SOP%20for%20Drone.pdf
- Digital Technologies in Agriculture: https://krishi.icar.gov.in/jspui/bitstream/123456789/47134/1/Drones%20in%20Agriculture%20%281%29.pdf
- E- Agriculture in Action: Drones for Agriculture: https://www.fao.org/3/i8494en/i8494en.pdf
- https://scholarworks.utep.edu/cgi/viewcontent.cgi?article=3879&context=open_etd

AG/HP/RC/AKP/SK