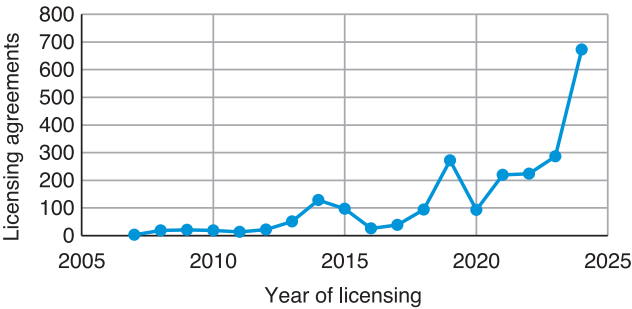
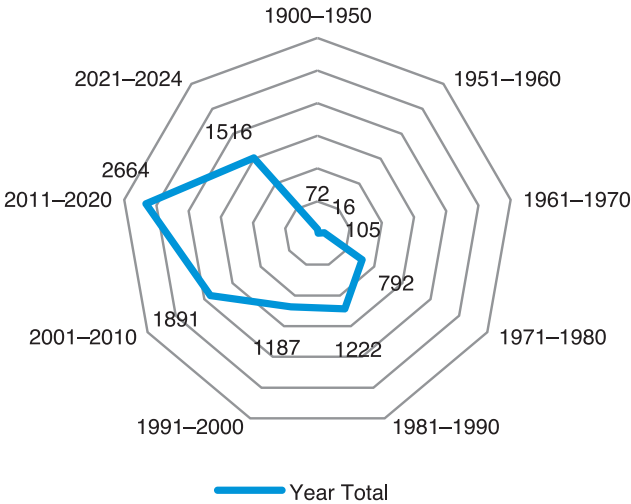
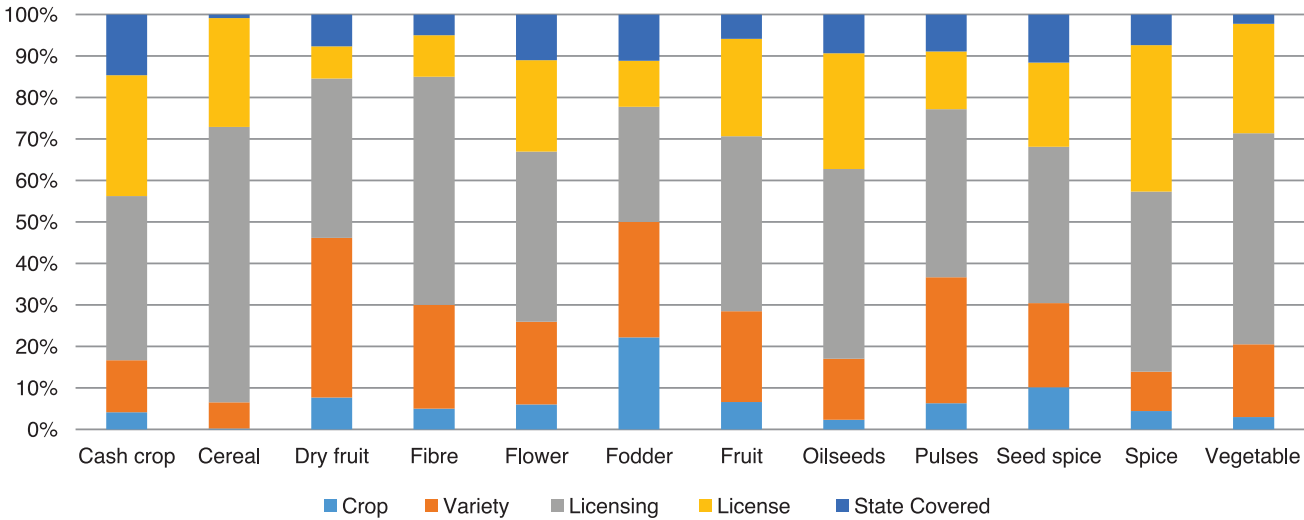


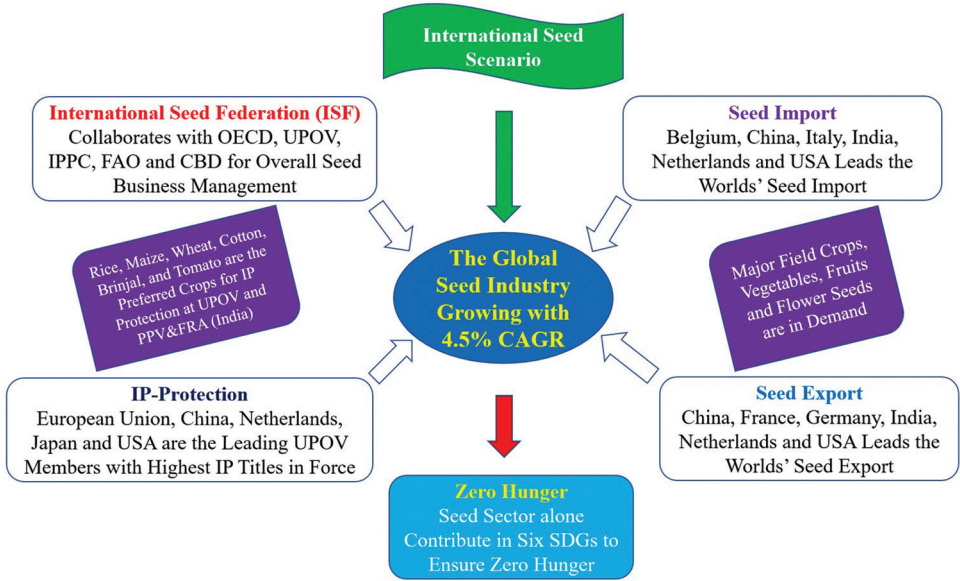


Supplementary Fig. 2 Year wise ICAR's plant variety commercialization/licensing activities.

Supplementary Fig. 1 Year wise plant variety released for cultivation.



Supplementary Fig. 3 Crop variety wise ICAR's plant variety commercialization/licensing activities.



Supplementary Fig. 4 International seed business and development scenario.

Supplementary Table 1 Crop and applicant wise registration status of Top-20 crop's varieties registered at PPV& FRA

S No	Crop Name	Applicant				Registration/Legal Status			Crop wise %Share in Applications	Crop wise % Share in Certificates
		Farmer	Private	Public	Grand Total	Certificate Issued	Application Closed	In Process		
1	Cash Crop-Tetraploid Cotton	4	1058	118	1180	702	176	304	5.89	8.07
2	Cereal-Finger Millet	169		24	193	30	65	98	0.96	0.34
3	Cereal-Maize	534	725	247	1506	611	467	428	7.52	7.02
4	Cereal-Pearl Millet	60	382	81	523	233	75	215	2.61	2.68
5	Cereal-Rice	5952	784	495	7231	3934	2527	770	36.11	45.20
6	Cereal-Sorghum	138	113	155	406	236	81	89	2.03	2.71
7	Cereal-Wheat	236	36	239	511	324	137	51	2.55	3.72
8	Fruit-Mango	330		4	334	132	143	59	1.67	1.52
9	Oilseed -Indian mustard	137	60	62	259	128	81	50	1.29	1.47
10	Pulse-Black gram	271	3	53	327	93	162	72	1.63	1.07
11	Pulse-Chickpea	173		100	273	117	131	25	1.36	1.34
12	Pulse-Field pea	162	6	51	219	96	95	28	1.09	1.10
13	Pulse-Green gram	115	5	66	186	58	83	45	0.93	0.67
14	Pulse-Pigeon pea	336	27	58	421	215	171	35	2.10	2.47
15	Spice-Turmeric	176		10	186	29	134	23	0.93	0.33
16	Vegetable-Bottle Gourd	147	35	9	191	21	96	74	0.95	0.24
17	Vegetable-Brinjal	198	271	27	496	220	189	87	2.48	2.53
18	Vegetable-Chilli	88	385	32	505	21	88	396	2.52	0.24
19	Vegetable-Okra	53	207	21	281	88	59	134	1.40	1.01
20	Vegetable-Tomato	65	357	41	463	153	152	158	2.31	1.76
Grand Total		9344	4454	1893	15691	7441	5112	3141	78.36	85.49
Overall Total Application Filed		12220	5146	2655	20024	8704	6889	4431		
%Share in Total Applications Filed		76.46	86.55	71.30	78.36	85.49	74.21	70.89		

Supplementary Table 2 Crop group wise plant varieties released for cultivation

S No	Crop Group	Crops	Varieties	% hare of Crops	% Share of Varieties
1	Bulb Vegetable	2	140	1.06	0.96
2	Cash Crop	2	6	1.06	0.04
3	Cereals	4	3200	2.13	21.96
4	Cole Crops	5	379	2.66	2.60
5	Cucurbits	19	1126	10.11	7.73
6	Fibre Crops	5	764	2.66	5.24
7	Flower Crops	8	37	4.26	0.25
8	Forage Crops	32	597	17.02	4.10
9	Fruit Crops	16	65	8.51	0.45
10	Fruit Vegetable	5	1600	2.66	10.98
11	Green Leafy Vegetable	6	83	3.19	0.57
12	Legumes Vegetable	9	207	4.79	1.42
13	Medicinal and Aromatic Plant	1	1	0.53	0.01
14	Millet	11	2246	5.85	15.41
15	Narcotics and Other Crops	2	25	1.06	0.17
16	Oilseeds	19	1756	10.11	12.05
17	Other Vegetable Crops	2	4	1.06	0.03
18	Pulses	16	1724	8.51	11.83
19	Root Vegetable	6	207	3.19	1.42
20	Spices and Condiments	6	101	3.19	0.69
21	Sugar Crops	3	179	1.60	1.23
22	Tuber and Rhizomes	9	127	4.79	0.87
	Grand Total	188	14,574	100.00	100.00

Supplementary Table 3 Worldwide Crop Wise Patent Filing Trends at different PFOs

Crop	Patent Families	Year-wise Patent Filing					Legal Status			Top-5 Patent Filing Countries						
		Before 2006	2006-2010	2011-2015	2016-2020	After 2020	Alive	Granted	Pending	Dead	1	2	3	4	5	IN
Cash Crop																
Cotton	7,45,543	88,163	32,683	92,759	2,96,096	2,35,842	3,52,048	3,05,577	46,471	3,93,495	CN	US	KR	JP	IN	
Sugarcane	20,947	1,693	1,653	5,250	7,938	4,413	9,076	6,146	2,930	11,871	CN	IN	US	EP	BR	
Cereal																
Pearl Millet	416	44	52	79	108	133	310	123	187	106	IN	US	EP	MX	BR	
Oat	38,021	7,252	4,576	8,374	11,726	6,093	15,506	11,029	4,477	22,515	CN	RU	US	EP	KR	7
Barley	50,753	11,324	6,954	11,674	14,083	6,718	19,248	13,915	5,333	31,505	CN	KR	US	EP	RU	7
Millet	28,734	5,301	2,707	6,875	9,663	4,188	9,069	6,117	2,952	19,665	CN	KR	US	IN	EP	
Maize	41,215	10,906	4,410	6,855	10,710	8,334	19,540	15,231	4,309	21,675	CN	US	EP	IN	CA	
Wheat	1,96,333	34,312	20,235	46,384	63,071	32,331	72,383	51,514	20,869	1,23,950	CN	RU	KR	JP	US	7
Sorghum	33,434	4,915	3,728	8,534	11,450	4,807	11,897	7,800	4,097	21,537	CN	US	KR	EP	IN	
Rice	3,81,244	63,136	31,371	81,796	1,33,347	71,594	1,36,037	99,449	36,588	2,45,207	CN	KR	JP	US	IN	
Oilseeds																
Mustard	28,078	7,455	3,615	6,945	6,853	3,210	10,302	7,588	2,714	17,776	CN	US	KR	JP	EP	6
Linseed	30,535	10,792	2,271	5,034	8,414	4,024	9,213	6,121	3,092	21,322	CN	US	EP	KR	JP	6
Safflower	48,016	8,273	6,133	13,858	14,449	5,303	11,671	7,706	3,965	36,345	CN	US	KR	EP	JP	6
Sesame	70,112	9,190	6,460	19,460	25,824	9,178	18,673	12,588	6,085	51,439	CN	KR	US	EP	JP	6
Rapeseed	45,198	6,323	4,658	10,545	16,612	7,060	15,823	10,860	4,963	29,375	CN	EP	US	KR	JP	6
Soybean	2,23,569	27,767	20,754	53,237	81,894	39,917	80,468	54,981	25,487	1,43,101	CN	US	KR	JP	EP	7
Groundnut	1,971	845	240	325	306	255	908	584	324	1,063	IN	US	EP	CN	MX	
Sunflower	52,020	10,176	6,100	13,297	13,842	8,605	24,342	17,396	6,946	27,678	CN	RU	US	EP	KR	6
Pulse Crops																
Black Gram	195	14	14	35	73	59	157	70	87	38	IN	EP	US	WO	CA	
Chickpea	4,084	613	285	653	1,339	1,194	2,024	1,007	1,017	2,060	CN	EP	US	IN	CA	
Cowpea	2,909	217	200	939	1,029	524	1,036	597	439	1,873	CN	US	EP	IN	CA	
Mung Bean	15,473	1,121	1,173	5,246	5,975	1,958	3,155	1,767	1,388	12,318	CN	EP	US	KR	CA	8
Pigeon Pea	579	31	44	173	178	153	289	154	135	290	CN	US	EP	IN	CA	
Lentil	2,930	809	282	435	723	681	1,544	895	649	1,386	EP	US	CN	CA	IN	
Pea	26,900	6,002	2,067	4,773	7,992	6,066	12,454	7,753	4,701	14,446	CN	EP	US	JP	KR	6
Grand Total	20,89,209	3,16,674	1,62,665	4,03,535	7,43,695	4,62,640	8,37,173	6,46,968	1,90,205	12,52,036						
% Share		15.15	7.78	19.31	35.59	22.14	40.07	30.96	9.1	59.92						

CN, China; IN, India; EP, European Union; US, United States; RU, Russian Federation; KR, Korea; JP, Japan; MX, Mexico; BR, Brazil; CA, Canada.

Supplementary Table 4 Country wise Patent Filing Trend of World's Top-100 Agricultural Universities

S No	Country	Universities	Year wise Patent Filing Trend (Nos.)							Legal Status		Active Applications (%)	Share of Country (%)	
			Before 2006							Total Applications	Alive			Dead
			2006-2010	2011-2015	2016-2020	After 2020								
1	Argentina	1	0	0	0	1	1	1	1	0	100	0.0003		
2	Australia	10	2,833	621	615	625	435	5,129	1,372	3,757	26.75	1.78		
3	Austria	1	0	0	1	12	1	14	14	0	100	0		
4	Belgium	2	0	0	0	1	3	4	3	1	75	0		
5	Brazil	1	254	360	470	409	280	1,773	1,203	570	67.85	0.62		
6	Canada	6	2,204	745	856	719	563	5,087	1,967	3,119	38.67	1.77		
7	China	5	6,552	17,532	40,181	70,357	74,896	2,09,518	1,12,120	97,398	53.51	72.81		
8	Denmark	2	47	68	84	163	94	456	253	203	55.48	0.16		
9	Finland	3	17	48	36	61	48	210	98	112	46.67	0.07		
10	France	2	0	1	0	1	0	2	2	0	100	0.001		
11	Germany	6	2	1	2	4	4	13	9	4	69.23	0.005		
12	India	2	6	6	14	184	204	414	405	9	97.83	0.14		
13	Israel	1	19	7	10	5	4	45	20	25	44.44	0.02		
14	Italy	4	2	0	0	1	0	3	1	2	33.33	0.001		
15	Japan	4	3,254	6,501	6,201	6,334	4,308	26,598	15,630	10,965	58.76	9.24		
16	Netherlands	2	27	42	42	60	31	202	95	107	47.03	0.07		
17	New Zealand	1	9	11	16	18	19	73	33	40	45.21	0.03		
18	Pakistan	1	0	0	0	1	1	2	0	2	0	0.001		
19	Saudi Arabia	1	2	71	223	385	125	806	640	166	79.4	0.28		
20	South Africa	2	78	33	48	49	23	231	131	100	56.71	0.08		
21	Spain	2	14	13	7	31	3	68	40	28	58.82	0.02		
22	Sweden	2	2	1	0	1	0	4	2	2	50	0.001		
23	Switzerland	2	85	60	79	115	114	453	257	196	56.73	0.16		
24	United Kingdom	6	1,227	650	496	470	396	3,239	807	2,432	24.92	1.13		
25	United States	31	11,833	4,873	5,591	6,507	4,602	33,406	15,154	18,241	45.36	11.61		
Grand Total			28,467	31,644	54,972	86,513	86,155	2,87,751	1,50,257	1,37,479		100		
% Share			9.89	11	19.1	30.07	29.94		52.22	47.78				

Supplementary Table 5 State wise Crop Variety Licensing Activities at ICAR

S No	State	Crop	Variety	Licensing	Licensee
1	Andhra Pradesh	12	34	37	22
2	Assam	5	10	10	3
3	Bihar	5	15	17	8
4	Chandigarh	1	1	1	1
5	Chhattisgarh	16	29	34	9
6	Gujarat	28	81	101	32
7	Haryana	11	43	405	148
8	Himachal Pradesh	2	2	5	5
9	Jammu & Kashmir	2	6	7	2
10	Jharkhand	5	5	9	4
11	Karnataka	32	72	105	58
12	Kerala	11	16	40	33
13	Madhya Pradesh	23	50	94	46
14	Maharashtra	36	118	302	148
15	Meghalaya	1	1	1	1
16	New Delhi	24	70	114	45
17	Odisha	14	27	50	22
18	Punjab	12	39	454	175
19	Rajasthan	13	35	65	34
20	Tamil Nadu	10	29	36	11
21	Telangana	27	122	223	66
22	Uttar Pradesh	22	53	105	50
23	Uttarakhand	6	25	41	14
24	West Bengal	10	29	43	22
Overall Total (Combined)		85	462	2299	959