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# AREA COVERAGE OF BINA DEVELOPED RICE, PULSE AND OILSEED VARIETIES IN BANGLADESH

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## Abstract

The study was conducted in 64 districts of Bangladesh to examine the area coverage of BINA developed rice, pulse and oilseed varieties during 2019-2020 and suggest some policy guidelines. Field survey data were used for this study and those were collected from 64 districts through concerned DAE office and substations of BINA. Both tabular and descriptive statistical analysis was used to fulfill the objectives. Finally, data were classified into 14 agricultural regions to identify the area coverage of BINA developed rice, pulses and oilseed varieties. The results showed the overall area coverage of BINA developed rice varieties were 6.45%. Among the three seasons; Aus, Aman and Boro the highest area coverage was found in Aman season i. e. 10.45% followed by Boro 2.46% and Aus 1.26%, respectively, The overall area coverage of BINA developed pulse and oilseed varieties were 2.03% and 1.73%., respectively.

**Keywords:** Area coverage, BINA variety, Rice, Pulse, Oilseed

## Introduction

Crop land is one of the most important issues for growth and expansion of human civilization. Agriculture is a greater contributor to poverty alleviation through jobs creation, food security and nutrition to world economies (Dan 2013). Bangladesh is one of the least developed countries in the world (Hasan, 2015), and is mostly dependent on agriculture (Sultana, 2010). In Bangladesh, Agriculture plays a leading role in the development and stability of the economy. The arable land in Bangladesh is 15.92 million hectares about 60 percent of the total land area which is contributing to feed 160 million people in Bangladesh (BBS, 2019). The country has a favorable natural environment for crop production. Of the arable land, 13.39 percent is under single cropping, 25.57 percent double cropping, 11.5 percent triple cropping, 0.10 quadruple cropping and 2.86 percent currently fallow land (BBS, 2019). As our population is increasing, cultivable land is decreasing day by day. Bangladesh has faced many factors in recent years that driving land use and land cover changes (LUCC) such as population dynamics; rapid changes in economic growth; climate change; construction of roads and highways; electrification; more advanced agriculture, technology and irrigation facilities; extended education; improved health services; new residential infrastructure; etc. (Hasan *et al* 2017). Rapid land use and land cover change (LUCC) induced land degradation, together with climate change and human activities, is thought to be a threat worldwide (Biro *et al*, 2013, Leh, M. *et al*, 2013, Wu, X, *et al*.2008).

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Keeping this in mind scientist of different institutes developed modern/ high yielding varieties. As a result, Bangladesh agriculture is now transforming from a traditional to a modern agricultural system. Now the country has been successful in maintaining most of its food demand for the existence of the fertile soils on the few vast floodplains that are annually refilled by siltation during the annual flood (Rahman and Islam, 2014), though there are considerable imports of some agricultural commodities. Area coverage of high yielding modern variety is increasing by replacing traditional variety. Here, Cropping Intensity increases up to 197 % (BBS 2019). The specific objectives of the present study were: i) to examine the area coverage of BINA developed rice, pulse and oilseed varieties; ii) to identify major constraints of BINA developed rice, pulse and oilseed varieties cultivation; and iii) to suggest some policy guidelines.

## Materials and Methods

The study was conducted in 64 districts under 14 agricultural regions of Bangladesh (Fig. 1). The 14 regions were assigned such as Reg-1: Cumilla region (Cumilla, B. Baria, Chandpur), Reg-2: Mymensingh region (Mymensingh, Sherpur, Kishoregonj, Netrokona, Jamalpur), Reg-3: Sylhet region (Sylhet, Moulovi Bazar, Hobiganj, Sunamganj), Reg-4: Rangamati region (Khagrachari, Bandorban, Rangamati) Reg-5: Khulna region (Khulna, Bagerhat, Meherpur, Kushtia, Chuadanga, Sathkhira), Reg-6: Barishal (Potuakhali, Jhalokati, Bhola, Borguna, Pirojpur, Barishal), Reg-7: Rajshahi region (Rajshahi, Pabna, Nawgaon, Sirajganj, Natore, Chapainawabganj), Reg-8: Ranpur Region (Gaibandha, Lalmonirhat, Rangpur, Kurigram), Reg-9: Dinajpur region (Dinajpur, Panchagorh, Thakurgaon, Nilphamary),

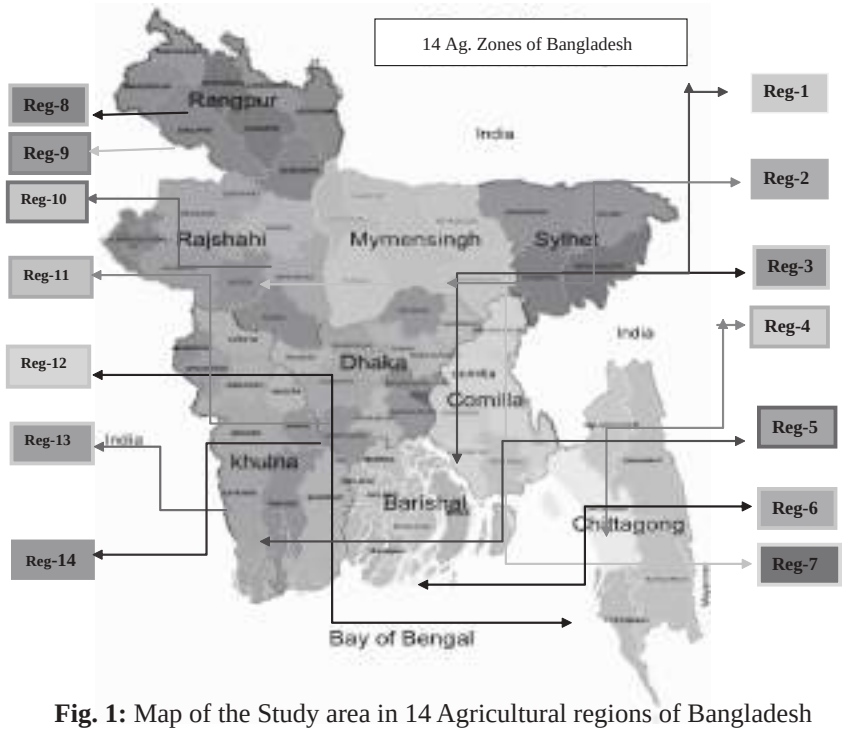


**Fig. 1:** Map of the Study area in 14 Agricultural regions of Bangladesh

Reg10: Bogura region (Bogura, Joypurhat), Reg-11: Dhaka region (Narsingdi, Narayanganj, Gajipur, Tangail, Manikganj, Munsiganj), Reg-12: Chattagram region (Noakhali, Cox's Bazar, Feni, Lakshmipur, Chattagram), Reg-13: Jashore region (Jashore, Narail, Magura, Jhenaidah), Reg-14: Faridpur region (Rajbari, Madaripur, Faridpur, Sariatpur, Gopalganj). Data were collected through pre designed interview schedule using structural questionnaire from DAE personnel. In the questionnaire per hectare area of BINA developed rice (Aus, Aman and Boro), pulses and Oilseed were included to fullfill the objectives. Besides, secondary data from Bangladesh Bureau of Statistics (BBS) was also used. Tabular and descriptive statistics using mean, average and percentage were used to analyze the collected data. The period of data collection was 2019-2020.

## Results and Discussion

The overall area coverage of BINA developed rice varieties were 6.45% (Table-1). Among the three rice seasons such as; Aus, Aman and Boro season the highest area coverage was found in Aman (10.45%) followed by Boro (2.46%) and Aus (1.26%), respectively (Fig. 2). In Aman season, the highest coverage was 9.55% for Binadhan-7 and the lowest was 0.00016 % for Binadhan-22 as it was a newly developed variety. In Boro season, the highest coverage was 1.58% for Binadhan-10 and the lowest was 0.038 % for Binadhan-6. In Aus season, the highest coverage was 0.69% for Binadhan-19 and the lowest was 0.002 % for Binadhan-21 (Fig. 3).

**Table 1. Variety wise area coverage of BINA developed rice varieties in 2019-2020 (in ha)**

| Rice | Varieties | Cultivated Area (%) | Area Coverage (%) |
|---|---|---|---|
| | Binadhan-5 | 5502.25 (1.00) | 0.1706 |
| Boro | Binadhan-6 | 1195 (0.22) | 0.0371 |
| 3224627.00 | Binadhan-8 | 11195 (2.03) | 0.3472 |
| (2.46 %) | Binadhan-10 | 50853.6 (9.2) | 1.577 |
| | Binadhan-14 | 8965.19 (1.62) | 0.278 |
| | Binadhan-18 | 1650.00 (0.3) | 0.0512 |
| Aus | Iratom | 5273 (0.95) | 0.5671 |
| 929824.00 | Binadhan-19 | 6444(1.17) | 0.693 |
| (1.26 %) | Binadhan-21 | 20.00 (0.001) | 0.0022 |
| | Binashail | 1204.00 (0.22) | 0.0273 |
| | Binadhan-7 | 421080 (76.22) | 9.5461 |
| | Binadhan-9 | 30.00 (0.01) | 0.0007 |
| | Binadhan-11 | 11697 (2.29) | 0.2652 |
| Aman | Binadhan-12 | 2193.00 (0.43) | 0.050 |
| 4411036.00 | Binadhan-13 | 45.00 (0.01) | .0010 |
| (10.45 %) | Binadhan-15 | 49.00 (0.01) | .0011 |
| | Binadhan-16 | 1870 (0.3) | .0420 |
| | Binadhan-17 | 22305 (4.04) | 0.5056 |
| | Binadhan-20 | 906.00 (0.16) | 0.0205 |
| | Binadhan-22 | 6.00 (0.001) | 0.00016 |
| Total | | 552483.04 (100%) | |
| (6.45 %) | | | |

The results presented in Table 2 depicted that among three seasons, area coverage was the highest for Aman 83.51% followed by Boro 14.36 % and the lowest for Aus i.e. 2.12 %. Among the 14 agricultural regions the highest area coverage was found 22.59 % in Jashore region (Reg-13) and the lowest found 0.67% in Rangamati region (Reg-04) (Fig. 4). In Jashore region, the highest area was found for Aman season 121811 ha and for Binadhan-7 about 1 lac hectare and the lowest was found for Aus season 111 ha. In Rangamati region, total Aman area was 2552.5 ha and Aus area was 127 ha. That is modern rice variety expansion is the lowest in hilly areas.

The results presented in Table 3 showed that the overall area coverage of BINA developed pulse varieties were 2.03%. The highest area as well as coverage was found 0.73 % for Binamoog-5 and lowest was 0.00016 % in case of Binachola-6 (Fig. 5).

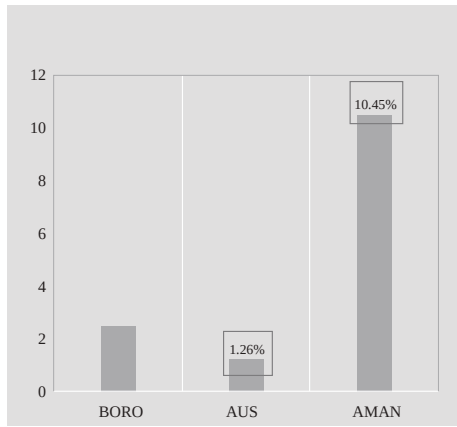


**Fig. 2** Cultivated areas of BINA developed rice (%)

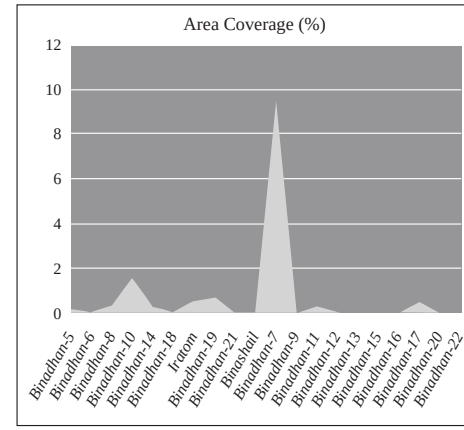


**Fig: 3** Area coverage of BINA developed rice (%)

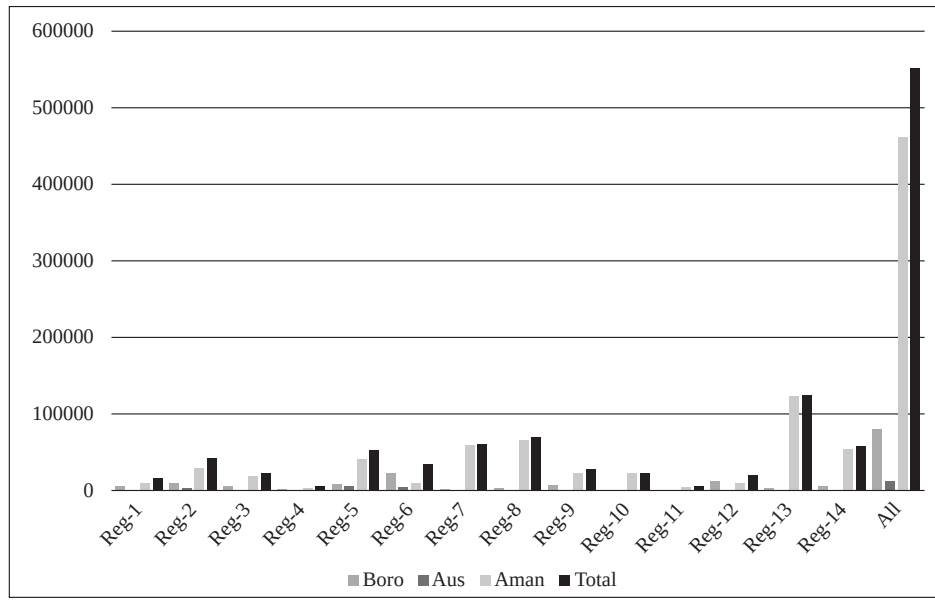


**Fig 4:** Regional coverage of BINA developed rice varieties during 2019-2020 in ha

**Table. 2 Region wise area coverage of BINA developed rice varieties during 2019-2020**

(in ha)

| Rice | Reg-1 | Reg-2 | Reg-3 | Reg-4 | Reg-5 | Reg-6 | Reg-7 | Reg-8 | Reg-9 | Reg-10 | Reg-11 | Reg-12 | Reg-13 | Reg-14 | All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boro | 5797.5 | 9482.8 | 5428.5 | 1008.5 | 7622 | 21422.2 | 1435.5 | 2466 | 6231 | 234 | 423.1 | 11043 | 2829 | 3937 | 79360.1 |
| | (7.31) | (11.95) | (6.84) | (1.27) | (9.60) | (26.99) | (1.81) | (3.11) | (7.85) | (0.29) | (0.53) | (13.92) | (3.56) | (4.96) | (14.36) |
| Aus | 49.5 | 2639.5 | 280.5 | 127.5 | 3609 | 3306 | 468 | 465 | 405 | 0 | 55 | 37.5 | 184 | 111 | 11737.5 |
| | (0.42) | (22.49) | (2.39) | (1.09) | (30.75) | (28.17) | (3.99) | (3.96) | (3.45) | (0.00) | (0.47) | (0.32) | (1.57) | 0.95 | (2.12) |
| Aman | 9373.5 | 29313.5 | 17229.5 | 2550.5 | 39742 | 9242.5 | 58049.2 | 65708.5 | 21350 | 21519 | 3293.4 | 8841.5 | 121811 | 53361 | 461385.1 |
| | (2.03) | (6.35) | (3.73) | (0.55) | (8.61) | (2.00) | (12.58) | (14.24) | (4.63) | (94.66) | (0.71) | (1.92) | (25.59) | (11.57) | (83.51) |
| Total | 15220.5 | 41435.8 | 22938.5 | 3686.5 | 50973 | 33970.7 | 59952.7 | 68639.5 | 27986 | 21753 | 3771.5 | 19922 | 124824 | 57409 | 552482.7 |
| | (2.75) | (7.50) | (4.15) | (0.67) | (9.23) | (6.15) | (10.85) | (12.42) | (5.07) | (3.94) | (0.68) | (3.61) | (22.59) | (10.39) | (100.00) |

Note: **Reg-1:** Cumilla region (Cumilla, B. Baria, Chandpur), **Reg-2:** Mymensingh region (Mymensingh, Sherpur, Kishoregonj, Netrokona, Jamalpur), **Reg-3:** Sylhet region (Sylhet, Moulovi Bazar, Hobiganj, Sunamganj), **Reg-4:** Rangamati region (Khagrachari, Bandorban, Rangamati) **Reg-5:** Khulna region (Khulna, Bagerhat, Meherpur, Kushtia, Chuadanga, Sathkhira), **Reg-6:** Barishal (Potuakhali, Jhalokati, Bhola, Borguna, Pirojpur, Barishal), **Reg-7:** Rajshahi region (Rajshahi, Pabna, Nawgaon, Sirajganj, Natore, Chapainawabganj), **Reg-8:** Ranpur Region (Gaibandha, Lalmonirhat, Rangpur, Kurigram), **Reg-9:** Dinajpur region (Dinajpur, Panchagorh, Thakurgaon, Nilphamary), **Reg10:** Bogura region (Bogura, Joypurhat), **Reg-11:** Dhaka region (Narsingdi, Narayanganj, Gajipur, Tangail, Manikganj, Munsiganj), **Reg-12:** Chattagram region (Noakhali, Cox's Bazar, Feni, Lakshmipur, Chattagram), **Reg-13**: Jashore region (Jashore, Narail, Magura, Jhenaidah), **Reg-14:** Faridpur region (Rajbari, Madaripur, Faridpur, Sariatpur, Gopalganj).

**Table 3. Variety wise area coverage of BINA developed Pulse varieties in 2019-2020**

(in ha)

| Pulse | Varieties | Cultivated area (ha) (%) | Coverage (%) |
|---|---|---|---|
| 1861298 (2.03 %) | Binamasur-5 | 3304.50 (8.73) | 0.17754 |
| | Binamasur-6 | 937.50 (2.48) | 0.05037 |
| | Binamasur-7 | 156.00 (0.41) | 0.00838 |
| | Binamasur-8 | 1412.25 (3.73) | 0.07587 |
| | Binamasur-9 | 120.00 (0.32) | 0.00645 |
| | Binamoog-4 | 97.50 (0.26) | 0.00524 |
| | Binamoog-5 | 13569.00 (35.84) | 0.72901 |
| | Binamoog-6 | 9620.25 (25.41) | 0.51686 |
| | Binamoog-7 | 1401.00 (3.70) | 0.07527 |
| | Binamoog-8 | 6373.50 (16.83) | 0.34242 |
| | Binamoog-9 | 9.00 (0.02) | 0.00048 |
| | Binachola-6 | 3.00 (0.01) | 0.00016 |
| | Binakhesari-1 | 724.50 (1.91) | 0.03892 |
| | Binamas | 135.00 (0.36) | 0.00725 |
| | Total | 37863.00 (100.00) | |

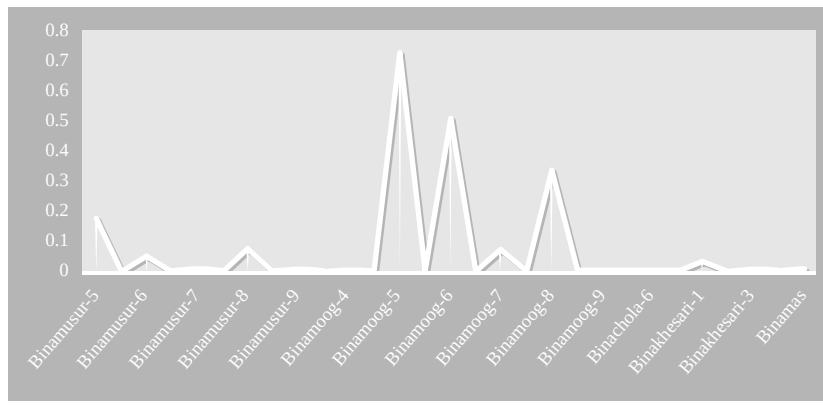


**Fig 5 :** Variety wise area coverage of BINA developed Pulse varieties in 2019-2020 in %.

It was observed in Table 4, among the 14 regions the highest area coverage for pulses was found in Barishal region 67.05% (Reg-6) and the lowest was found in Sylhet and Chattagram region 0.00% (Reg-3 and Reg-12), respectively.

**Tabe 4. Region wise adoption of BINA developed Pulse and Other varieties in 2019-2020**

(in ha)

| Pulse | Reg-1 | Reg-2 | Reg-3 | Reg-4 | Reg-5 | Reg-6 | Reg-7 | Reg-8 | Reg-9 | Reg-10 | Reg-11 | Reg-12 | Reg-13 | Reg-14 | All (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Binamasur | 0.00 | 0.00 | 0.00 | 24.8 | 227.25 | 1.14 | 1231.1 | 12.5 | 0.00 | 0.00 | 0.00 | 0.00 | 1348 | 3085.5 | 5930.29 |
| | | | | (.42) | (3.83) | (0.02) | (20.76) | (.21) | | | | | (22.73) | (52.03) | (15.66) |
| Binamoog | 244.5 | 67.5 | | 11.96 | 153.25 | 24945.5 | 2238.26 | 114.88 | 1296.25 | 9 | | | 1408.5 | 580.65 | 31064.50 |
| | (0.79) | (0.22) | 0.00 | (.04) | (.49) | (80.30) | (7.21) | (0.37) | (4.17) | (0.02) | 0.00 | 0.00 | (4.53) | (1.87) | (82.04) |
| Binachola | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3 | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | 3 |
| | | | | | | | (100) | | | | | | | | (0.01) |
| Binakhesari | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 439 | 216 | 0.00 | 0.00 | 0.00 | 69.5 | 0.00 | 0.00 | 0.00 | 724.5 |
| | | | | | | (60.59) | (29.81) | | | | (9.59) | | | | (1.91) |
| Binamas | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 135 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 135 |
| | | | | | | | (100) | | | | | | | | (0.36) |
| Sub total | 244.5 | 67.5 | 0.00 | 36.76 | 380.5 | 25385.64 | 3829.36 | 127.38 | 1296.25 | 3.00 | 69.50 | 0.00 | 2756.5 | 3666.15 | 37863.04 |
| | (0.65) | (.18) | | (.10) | (1.00) | (67.05) | (10.11) | (0.34) | (3.42) | (0.01) | (0.18) | | (7.23) | (9.68) | (100) |
| Binarasun | 0 | 0 | 117 | 0 | 0 | 0 | 153 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 270 |
| Binagom | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 319.5 | 319.5 |

Note: **Reg-1:** Cumilla region (Cumilla, B. Baria, Chandpur), **Reg-2:** Mymensingh region (Mymensingh, Sherpur, Kishoregonj, Netrokona, Jamalpur), **Reg-3:** Sylhet region (Sylhet, Moulovi Bazar, Hobiganj, Sunamganj), **Reg-4:** Rangamati region (Khagrachari, Bandorban, Rangamati) **Reg-5:** Khulna region (Khulna, Bagerhat, Meherpur, Kushtia, Chuadanga, Sathkhira), **Reg-6:** Barishal (Potuakhali, Jhalokati, Bhola, Borguna, Pirojpur, Barishal), **Reg-7:** Rajshahi region (Rajshahi, Pabna, Nawgaon, Sirajganj, Natore, Chapainawabganj), **Reg-8:** Ranpur Region (Gaibandha, Lalmonirhat, Rangpur, Kurigram), **Reg-9:** Dinajpur region (Dinajpur, Panchagorh, Thakurgaon, Nilphamary), **Reg10:** Bogura region (Bogura, Joypurhat), **Reg-11:** Dhaka region (Narsingdi, Narayanganj, Gajipur, Tangail, Manikganj, Munsiganj), **Reg-12:** Chattagram region (Noakhali, Cox's Bazar, Feni, Lakshmipur, Chattagram), **Reg-13**: Jashore region (Jashore, Narail, Magura, Jhenaidah), **Reg-14:** Faridpur region (Rajbari, Madaripur, Faridpur, Sariatpur, Gopalganj).

The results presented in Table 5 were found that, the overall area coverage of BINA developed oilseed varieties were 1.73 %. The highest area coverage was found 0.391 % for Binasarisha-4 and the lowest 0.0002 % was seen in case of Binachinabadam-5 (Fig. 6).

**Table 5. Variety wise area coverage of BINA developed oil seed varieties during 2019-20**

(in ha)

| Oil Seed | Varieties | Cultivated area (ha) (%) | Coverage (%) |
|---|---|---|---|
| 2248344 | Binasoybean-3 | 280.75 (0.72) | 0.012487 |
| (1.73 %) | Binasoybean-5 | 4268.75 (10.95) | 0.189862 |
| | Binachinabadam-2 | 191.25 (0.49) | 0.008506 |
| | Binachinabadam-3 | 90.56 (0.23) | 0.004028 |
| | Binachinabadam-4 | 5606.03 (14.38) | 0.24934 |
| | Binachinabadam-5 | 4.46 (0.01) | 0.000198 |
| | Binachinabadam-6 | 424.84 (1.09) | 0.018896 |
| | Binachinabadam-7 | 306.00 (0.78) | 0.01361 |
| | Binachinabadam-8 | 884.48 (2.27) | 0.039339 |
| | Binachinabadam-9 | 21.73 (0.06) | 0.000966 |
| | Binachinabadam-10 | 12.32 (0.03) | 0.000548 |
| | Binatil-1 | 1060.34 (2.72) | 0.047161 |
| | Binatil-2 | 1815.50 (4.66) | 0.080748 |
| | Binatil-3 | 1150.00 (2.95) | 0.051149 |
| | Binatil-4 | 1108.00 (2.84) | 0.049281 |
| | Binasarisha-4 | 8786.92 (22.54) | 0.390817 |
| | Binasarisha-5 | 350.10 (0.90) | 0.015571 |
| | Binasarisha-7 | 1045.50 (2.68) | 0.046501 |
| | Binasarisha-8 | 2706.15 (6.94) | 0.120362 |
| | Binasarisha-9 | 7468.91 (19.16) | 0.332196 |
| | Binasarisha-10 | 1399.00 (3.59) | 0.062224 |
| | Total | 38981.59 (100.00) | |

The result presented in Table 6 revealed that, among the 14 regions the highest area coverage was found 9562.80 (24.53 %) ha in Region 13 and the lowest was found 0.00 ha in region 3 (Fig. 7 and 8).

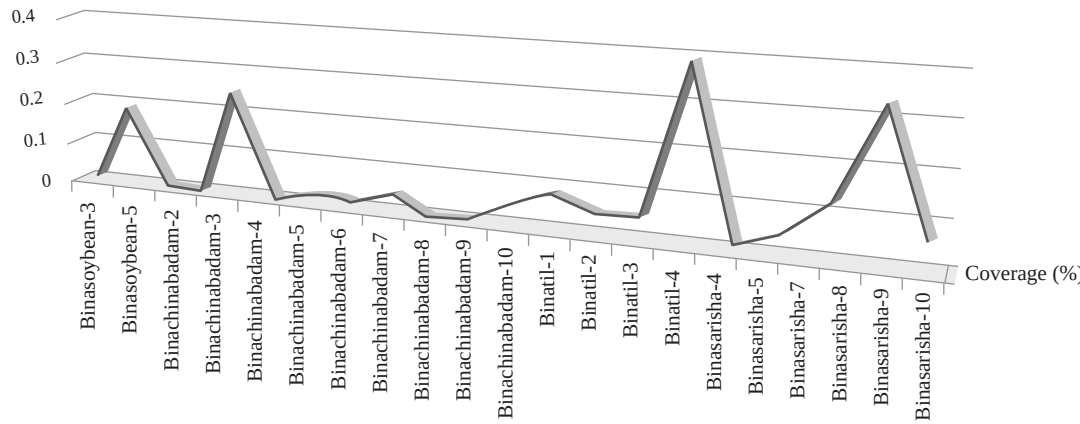


**Fig. 6:** Variety wise area coverage of BINA developed oil seed varieties during 2019-20.

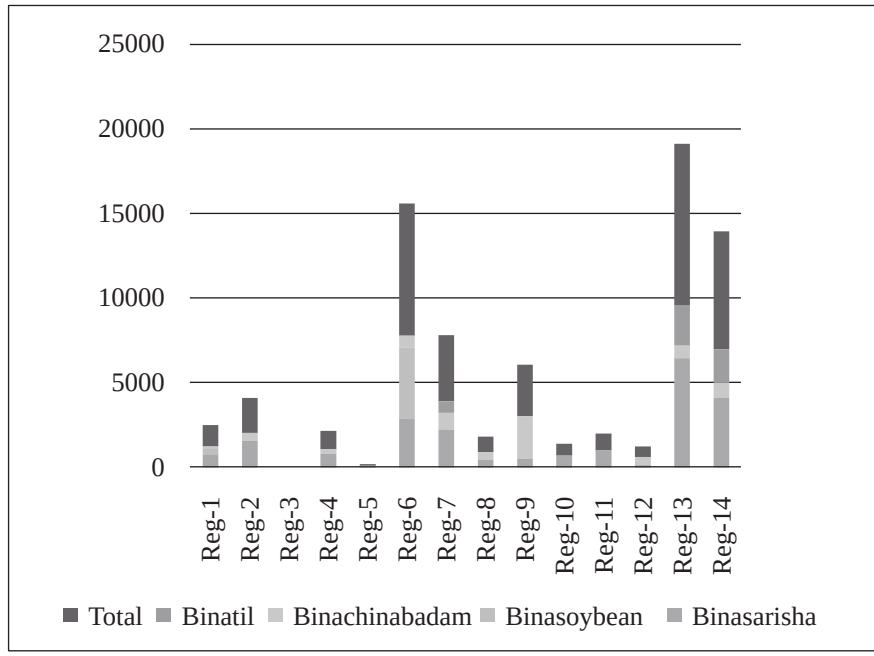


**Fig. 7:** Cultivated areas of BINA developed oilseed varieties in 14 Ag. regions of Bangladesh

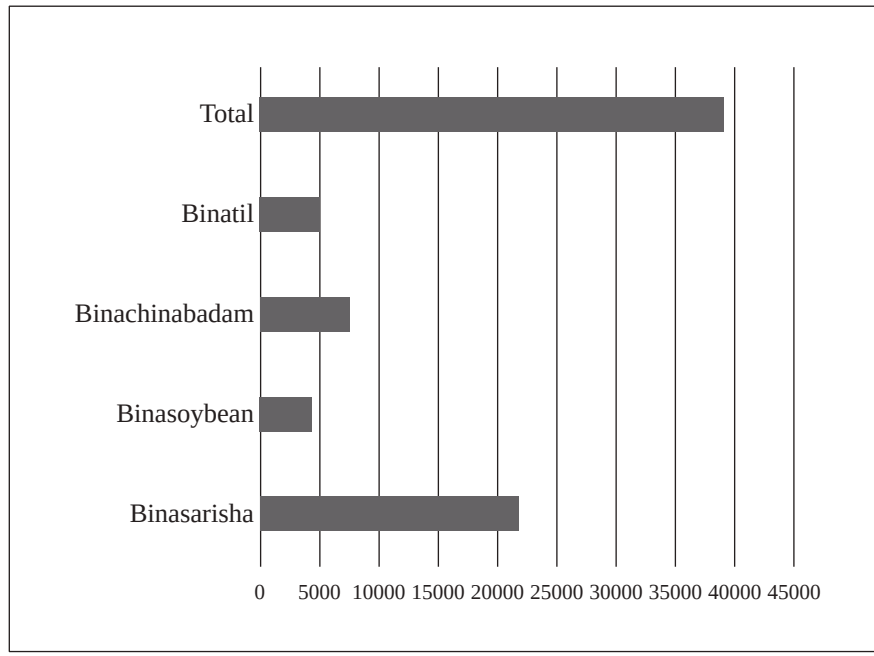


**Fig. 8:** Total areas of BINA developed oilseed varieties in Bangladesh

**Table 6. Region wise adoption of BINA developed Oilseed varieties during 2019-2020**

(in ha)

| Oil seed | Reg-1 | Reg-2 | Reg-3 | Reg-4 | Reg-5 | Reg-6 | Reg-7 | Reg-8 | Reg-9 | Reg-10 | Reg-11 | Reg-12 | Reg-13 | Reg-14 | All (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Binasarisha | 780 | 1578.66 | 0 | 820 | 47.55 | 2915.25 | 2245.5 | 450 | 529.01 | 701.25 | 998.86 | 130.5 | 6450 | 4110 | 21756.58 |
| | (3.59) | (7.26) | (0.00) | (3.77) | (0.22) | (13.40) | (10.32) | (2.07) | (2.43) | (3.22) | (4.59) | (0.60) | (29.65) | (18.89) | (55.81) |
| Binasoybean | 360 | 0 | 0 | 0 | 0 | 4177.5 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 4549.5 |
| | (7.91) | (0.00) | (0.00) | (0.00) | (0.00) | (91.82) | (0.00) | (0.00) | (0.00) | 0.00 () | (0.00) | (0.00) | (0.26) | (0.00) | (11.671 |
| Binachinabadam | 106.5 | 434.5 | 0 | 232.74 | 52.13 | 645 | 975 | 457.5 | 2505 | 0 | 3 | 486 | 738.3 | 906 | 7541.67 |
| | (1.41) | (5.76) | (0.00) | (3.09) | (0.69) | (8.55) | (12.93) | (6.07) | (33.22) | (0.00) | (0.04) | (6.44) | (9.79) | (12.01) | (19.35) |
| Binatil | 3 | 38 | 0 | 30 | 0.3 | 57 | 687 | 0 | 0 | 0 | 0 | 0 | 2362.5 | 1956 | 5133.8 |
| | (0.06) | (0.74) | (0.00) | (0.58) | (0.01) | (1.11) | (13.38) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (46.02) | (38.10) | (13.17) |
| Total | 1249.5 | 2051.16 | 0 | 1082.7 | 99.98 | 7794.75 | 3907.5 | 907.5 | 3034.01 | 701.25 | 1001.9 | 616.5 | 9562.8 | 6972 | 38981.55 |
| | (3.21) | (5.26) | (0.00) | (2.78) | (0.26) | (20.00) | (10.02) | (2.33) | (7.78) | (1.80) | (2.57) | (1.58) | (24.53) | (17.89) | (100.00) |



Note: **Reg-1:** Cumilla region (Cumilla, B. Baria, Chandpur), **Reg-2:** Mymensingh region (Mymensingh, Sherpur, Kishoregonj, Netrokona, Jamalpur), **Reg-3:** Sylhet region (Sylhet, Moulovi Bazar, Hobiganj, Sunamganj), **Reg-4:** Rangamati region (Khagrachari, Bandorban, Rangamati) **Reg-5:** Khulna region (Khulna, Bagerhat, Meherpur, Kushtia, Chuadanga, Sathkhira), **Reg-6:** Barishal (Potuakhali, Jhalokati, Bhola, Borguna, Pirojpur, Barishal), **Reg-7:** Rajshahi region (Rajshahi, Pabna, Nawgaon, Sirajganj, Natore, Chapainawabganj), **Reg-8:** Ranpur Region (Gaibandha, Lalmonirhat, Rangpur, Kurigram), **Reg-9:** Dinajpur region (Dinajpur, Panchagorh, Thakurgaon, Nilphamary), **Reg10:** Bogura region (Bogura, Joypurhat), **Reg-11:** Dhaka region (Narsingdi, Narayanganj, Gajipur, Tangail, Manikganj, Munsiganj), **Reg-12:** Chattagram region (Noakhali, Cox's Bazar, Feni, Lakshmipur, Chattagram), **Reg-13**: Jashore region (Jashore, Narail, Magura, Jhenaidah), **Reg-14:** Faridpur region (Rajbari, Madaripur, Faridpur, Sariatpur, Gopalganj).

The study identified some problem and solution to increase area coverage of BINA developed varieties such as i) Non availability of seed which was rank I and then ii) increasing number of demonstrations in the union level; iii) more training facilities and iv) develop collaboration with DAE personnel and v) more location specific variety is needed (Table 7). For BINA variety cultivation, the highest suggestion was adequate seed supply in every season as early as possible which was rank I and then more training, demonstration, leaflet is needed. Besides inter-linkage among DAE-BADC-BINA and the farmers through project and storage capacity should be increased was found (Rank V).

**Table 7. Constraints and suggestions by DAE personnel**

| Item | No. of respondents | (%) | Rank |
|---|---|---|---|
| **Constraints** | | | |
| Non availability of seed | 12 | 10.43 | I |
| Lack of demonstration | 9 | 7.83 | II |
| Lack of marketing facilities | 6 | 5.22 | IV |
| Lack of training facilities both in extension worker and farmers | 8 | 6.96 | III |
| Lack of proper planning between DAE and BINA | 6 | 5.22 | IV |
| More location -specific variety is needed | 5 | 4.35 | V |
| **Suggestions** | | | |
| Ensure adequate seed in every season as early as possible | 12 | 10.43 | I |
| More demonstration is needed to popularize these variety through DAE | 8 | 6.96 | III |
| Inter-linkage is needed among DAE-BADC-BINA and the farmers through project | 6 | 5.22 | V |
| Arrangement of proper training for DAE officer, extension worker and farmer | 10 | 8.70 | II |
| Storage capacity should be increased | 6 | 5.22 | V |
| More distribution of leaflet | 7 | 6.09 | IV |

## Conclusion

Area coverage of BINA developed variety is increasing day by day and the continuation for variety expansion, it should be ensured the seed demand at proper time. To facilitate the dissemination more training, demonstration, collaboration with DAE and BADC as well as research and its budget should be increased which would support in food production.

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