



Growth and Yield Attributes of Naturally Growing Floating Rice in *Tal* Lands of Ballia District (U.P.)

Naveen Kumar Shukla* and Ashok Kumar Singh

Department of Agricultural Chemistry and Soil Science, Faculty of Agriculture, Shri Murli Manohar Town P.G. College, Ballia, Jananayak Chandrashekhar, University, Ballia U.P, India

***Corresponding Author:** Naveen Kumar Shukla, Department of Agricultural Chemistry and Soil Science, Faculty of Agriculture, Shri Murli Manohar Town P.G. College, Ballia, Jananayak Chandrashekhar, University, Ballia U.P, India.

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Abstract

A study was conducted in 2022-2023 at the on growth, yield and quality of naturally growing floating rice in Suraha *Tals* and Dah *Tals* of Ballia district during kharif season. About three block area cover around the low-laying area of Suraha *Tal* i.e. Hanumanganj, Beruarbari and Bansdih and three blocks area cover around the Dah *Tal* i.e. Maniyar, Bansdih and Reoti block. The different village of targeted blocks were selected as site for purpose of study. At each site two spots, out of which one indicating floating rice spot-1 and another floating rice spot-2, were fixed as the site of plant samples collection. Thus, the sample collection will confine to these twenty-four spots only. The naturally growing floating rice plant height, number of tillers, chlorophyll content, number of panicles, number of grain panicle⁻¹ unfilled and filled, panicle length, test weight, grain yield, straw yield, grain length and grain breadth recorded from 20 to 160 days of crop duration. Plant height was ranged 25.5 to 340.7 cm, number of tillers 23 to 35 hill⁻¹, chlorophyll content 2.76 to 4.03, number of panicles 210 to 239 m⁻², number of grain panicle⁻¹ unfilled and filled 151 and 129, panicle length 23.3 to 25.2 cm, test weight 21.0 to 23.6 g, grain yield 36.30 to 47.96 q ha⁻¹, straw yield 42.22 to 57.07 q ha⁻¹, grain length 6.02 to 6.13 mm and grain breadth was ranged from 2.16 to 2.26 mm in the Suraha *Tal* and Dah *Tal*. Therefore, naturally grown floating rice in Suraha *Tal* and Dah *Tal* has distinct future of growth and yield attributes but Suraha *Tal* land soils grown floating rice growth and yield attributes were greater than Dah *Tal* land soils.

Keywords: Floating Rice; Flooded Area; *Tal* Lands; Submerged Rice; Deep-Water Rice

Introduction

In north and central India, rice is grown mostly in wet season with unpredictable rainfall distribution. It is also grown in areas, where water depth reaches 2-3 m or more. Rice is primarily grown under four major ecosystems broadly classified as *Irrigated rice eco-system* - Total area under irrigated rice in the country is about 26.0 mha accounting for about 60% of the total area under the crop. It includes the areas in Punjab, Haryana, Uttar Pradesh, Jammu and Kashmir, Andhra Pradesh, Telangana, Tamil Nadu, Kar-

nataka, Himachal Pradesh and Gujarat. *Rainfed lowland rice ecosystem*: In India, lowland rice covers an area of about 12.0 mha, which accounts for about 27% of the total area, located mainly in eastern India. The area is characterized by poor soil quality and frequent occurrence of drought/flood due to erratic rains. *Rainfed upland rice ecosystem*: Total area under rainfed upland rice in the country is about 4.8 mha, which accounts for 11% of total area, located mainly in Eastern Zone i.e., Assam, Bihar, Chhattisgarh, Eastern Uttar Pradesh, Jharkhand, Madhya Pradesh, Odisha, West Bengal, and

North East Hill Region. The rainfed upland ecosystem is drought prone. *Flood-prone rice ecosystem*: It occupies about 1.3 mha in eastern states i.e., 3% of the country. The crop is grown in shallow (up to 30 cm), semi-deep (30-100 cm) and deepwater (>100 cm) ecosystems in eastern Uttar Pradesh, Bihar, West Bengal, Assam and Odisha (Pathak, *et al.*, 2020). Lowland rice is typically cultivated in paddies of 5 to 25 cm of standing water, which are highly vulnerable to monsoon flash floods of 50 cm or more that can rapidly and completely submerge plants. Prolonged submergence is a major production constraint and affects 22 million ha of rainfed lowland rice in South and Southeast Asia. Which is about 6 million ha area in India (Sarkar, *et al.*, 2006) [1]. It is cultivated in five ecosystems where the source of water supply and the degree of flooding are the major environmental determinants. The rice types corresponding to these ecosystems are rain-fed low- and upland rice, rice grown under controlled irrigated conditions, deepwater rice, and rice in tidal wetlands. Rice grown in the deepwater ecosystem distinguishes itself from most modern rice varieties by its ability to survive in water depths of more than 50 cm for at least 1 month (Catling, 1992). Among the deepwater rice types, the so-called floating rice shows extreme elongation capacity. They can grow at rates of 20 to 25 cm/d when partially submerged and can reach a length of up to 7 m in water depths of up to 4 m (Catling, 1992). However, in the present study, an attempt has been made to assess the growth and yield attributes of naturally growing floating rice in *Tal* land soils of Ballia (UP).

Materials and Methods

The sample collection and survey experiment was conducted during Kharif season 2022-2023 by recorded observation on floating rice of *Tal* lands (Suraha *Tal* and Dah *Tal*) of Ballia district. First of all, a visual reconnaissance survey of the *Tal* lands was made, and the entire *Tal* land was divided into two groups *viz*; lowland and semi lowland depending upon the condition of waterlogging. Low land is permanently under waterlogged condition while semi low land is temporarily (about 8-9 months) waterlogged. That area was remained muddy sometime dried, in the months of May and June (2022-2023) before the arrival of monsoon rain. Three blocks area cover around the low-laying area of Suraha *Tal* i.e. Hanuman-ganj, Beruarbari and Bansdih Blocks, around the Dah *Tal* i.e. Mani-yar, Bansdih and Reoti blocks of different village were selected as site for purpose of study. At each site two spots, out of which one indicating floating rice spot-1 and another floating rice spot-2, were

fixed as the site of samples collection. Thus, the sample collection will confine to these 24 spots only. Plant samples were carefully collected during the waterlogged condition by boat of deep submerged standing water of two *Tal* lands (Suraha *Tal* and Dah *Tal*) at critical stages of crop (naturally grown floating rice) growth. The selected plants were measured by the help of long bamboo stick and measuring tap for plant height and water depth. whole plants were cleaned with tap water and subsequently with distilled water to remove the adhering soil. In the tillering and flowering stages shoots were amalgamated. At harvesting stage, the grain and straw were separated. Collected plant samples were dried in shade and oven dried at 65 °C. Then the samples were ground separately in a wiley mill using stainless steel blades and used for nutrient content analysis. At harvesting stage, the dry matter was partitioned into grain and straw and analyses were carried out accordingly.

Results and Discussion

The water level was observed in Suraha *Tal* and Dah *Tal* during rainy season was wonderful and very informative. The maximum flood depth of the grown area was occurred from July to end of November. The water level increased not only due to heavy rains but that was also affected by the rise of water level river Ganga and Ghaghra due to over flooding towards the lake. The water from study area was drained out through Katehar Nala and that was regulated from the water flow towards the river Ganga and Ghaghra. That caused partial lying down of naturally growing floating rice plant as floating over the surface of water.

Growth attributing of floating rice

Plant height (cm)

The Suraha *Tal* water depth and plant height (cm) (Table 1) of naturally grown floating rice data ranged from 24.2 to 326.5 and 27.6 to 343.7 and Dah *Tal* water depth and plant height (cm) of naturally grown floating rice data ranged from 21.8 to 305.6 and 25.5 to 326.7 cm. In the Suraha *Tal* grown rice plant was maximum water depth and plant height measured at 160 days of 343.7, 342.5, 338.8, 338.2, 335.7 and 334.2 (cm) in water depth 325.6, 323.8, 324.3, 326.5, 320.8 and 318.8 in Basantpur, Maritar, Suryapura, Shivpur, Fulwariya and Brahmayin villages and maximum plant height was measured at 140 days of 307.7, 306.2, 304.8, 303.6, 300.2 and 297.6 (cm) in water depth 290.2, 289.2, 287.6, 291.8, 285.4 and 284.2 in site of Basantpur, Maritar, Shivpur, Suryapura, Fulwariya and Brahmayin villages, at 120 days plant height was

265.2, 264.2, 263.5, 262.8, 260.2 and 258.5 (cm) in water depth 255.6, 253.2, 252.4, 255.8, 250.7 and 248.2 in Basantpur, Maritar, Shivpur, Suryapura, Fulwariya and Brahmayin villages respectively. At of plant height was 100 days of 226.5, 224.8, 223.8, 222.3, 220.5 and 217.5 (cm) in water depth 212.6, 210.7, 211.6, 213.7, 208.6 and 207.0 in Basantpur, Maritar, Suryapura, Shivpur, Fulwariya and Brahmayin villages. At 80 days of plant height was 156.6, 155.5, 154.4, 153.5, 151.2 and 149.8 (cm) in water depth 145.2, 142.3, 144.5, 146.8, 140.0 and 138.8 in Basantpur, Maritar, Suryapura, Shivpur, Fulwariya and Brahmayin villages. At 60 days of 71.2, 70.9, 69.6, 68.5, 68.4 and 57.2 (cm) in water depth 60.8, 62.6, 58.5, 61.5, 58.7 and 57.5 in Basantpur, Maritar, Shivpur, Suryapura, Fulwariya and Brahmayin villages. At 40 days of plant height of rice plant was measured 40.5, 39.2, 38.7, 37.6, 37.2 and 34.2 (cm) in water depth 35.6, 34.8, 36.3, 35.8, 34.8 and 30.8 on the site of Basantpur, Maritar, Suryapura, Shivpur, Fulwariya and Brahmayin villages. In the early stage of floating rice, plant height was measured at 20 days of 32.3, 30.2, 29.5, 29.3, 28.5 and 27.6 (cm) in water depth 26.8, 25.5, 25.2, 28.5, 24.8 and 24.2 cm on site of Basantpur, Maritar, Suryapura, Shivpur, Fulwariya and Brahmayin villages respectively. The mean value of naturally grown floating rice of Suraha *Tal* land soils of plant height was 338.8, 303.3, 262.8, 222.5, 153.5, 67.6, 37.9 and 29.5 in water depth 25.8, 34.6, 59.9, 142.9, 210.7, 252.6, 288.6 and 323.3 cm from 20 days to 160 days of crop duration.

Similarly, in the Dah *Tal*, the maximum plant height was measured 160 days of 326.7, 325.8, 325.4, 324.6, 324.0 and 322.8 (cm) in water depth 305.6, 303.2, 302.7, 303.7, 304.6 and 300.6 cm on site of Halpur, Ghogha, Kewtaliya, Duhi Musi, Dal Chhapra and Chaubey Chhapra village. The magnitude of slightly maximum plant height was measured at 140 days of crop duration was 302.4, 300.8, 299.6, 298.7, 297.5 and 295.3 (cm) in water depth 286.2, 284.0, 282.7, 280.7, 281.5, 279.2 and 282.3 cm on site of Ghogha, Halpur, Kewtaliya, Dal Chhapra, Duhi Musi and Chaubey Chhapra villages. At 120 days of crop duration, plant height was 255.8, 254.0, 253.6, 252.2, 251.8 and 248.6 (cm) in water depth 240.2, 238.2, 237.5, 235.5, 234.0, 230.5 and 235.9 cm on site of Ghogha, Halpur, Kewtaliya, Duhi Musi, Dal Chhapra and Chaubey Chhapra villages. At 100 days of crop duration, plant height was 215.2, 214.2, 212.6, 210.8, 208.6 and 206.4 (cm) in water depth 200.5, 198.0, 197.0, 195.2, 194.0, 192.6 and 196.2 cm on site of Ghogha, Halpur, Kewtaliya, Duhi Musi, Dal Chhapra and Chaubey Chhapra villages. At 80 days, plant height was 147.6, 144.8, 144.2, 142.5, 141.3 and

140.2 cm in water depth 135.5, 131.7, 136.0, 130.5, 133.6, 129.4 and 132.7 cm on the site of Kewtaliya, Dal Chhapra, Ghogha, Halpur, Dal Chhapra and Chaubey Chhapra villages. At 60 days, height was 65.2, 63.2, 62.7, 62.5, 61.3 and 59.9 cm in water depth 50.2, 48.6, 49.3, 48.2, 46.5, 45.4 and 48.0 cm on the site of Ghogha, Kewtaliya, Duhi Musi, Halpur, Dal Chhapra and Chaubey Chhapra villages. At 40 days, height was 35.7, 34.8, 34.6, 34.5, 34.2 and 33.8 cm in water depth 32.8, 31.5, 30.8, 31.2, 30.2, 30.4 and 31.1 on the site of Ghogha, Dal Chhapra, Duhi Musi, Halpur, Kewtaliya and Chaubey Chhapra villages while minimum plant height was measured at 20 days 27.3, 27.2, 26.5, 25.8, 25.7 and 25.5 cm in water depth of 22.5, 23.4, 22.8, 24.6, 21.8, 23.3 and 23.6 cm on the site of Duhi Musi, Chaubey Chhapra, Halpur, Ghogha, Kewtaliya and Dal Chhapra villages. The mean value of naturally grown floating rice of Dah *Tal* land soils of plant height was 26.3, 34.6, 62.4, 143.7, 211.3, 252.6, 299.0 and 324.8 in water depth 23.6, 31.1, 48.0, 132.7, 196.2, 235.9, 282.3 and 303.4 at 20 days to 160 days.

Number of Tillers (Per hill)

The Suraha *Tal* number of tillers (hill⁻¹) (Table 2) of naturally grown floating rice data ranged from 29 to 35 and Dah *Tal* number of tillers (hill⁻¹) of naturally grown floating rice data ranged from 23 to 28. In the Suraha *Tal* maximum number of tillers 35 hill⁻¹ count in the Basantpur and slightly maximum number of tillers 34 hill⁻¹ in Fulwariya, 32 in Maritar, 31 in Shivpur, 30 in Brahmayin and minimum number of tillers 29 hill⁻¹ in Suryapura. In the Dah *Tal* maximum number of tillers 28 hill⁻¹ count in the Dal Chhapra and slightly maximum number of tillers 27 hill⁻¹ in Chaubey Chhapra, 26 in Ghogha and Duhi Musi, 25 in Halpur and minimum number of tillers 23 hill⁻¹ in Kewtaliya. Similar finding was also reported by Afrin, *et al.* (2017). The mean value of number of tillers hill⁻¹ 31.8 and 25.8 in Suraha and Dah *Tal*.

Chlorophyll (mg m⁻²)

The Suraha *Tal* Chlorophyll content (mg m⁻²) (Table 2) of naturally grown floating rice data ranged from 3.09 to 4.03 and Dah *Tal* Chlorophyll content (mg m⁻²) of naturally grown floating rice data ranged from 2.76 to 3.19. In the Suraha *Tal* maximum chlorophyll content 4.26 mg m⁻² in the Basantpur and slightly maximum chlorophyll content 3.93 in Fulwariya, 3.81 in Basantpur, 3.74 in Suryapura, 3.68 in Shivpur 3.63 in Suryapura, 3.55 in Suryapura, 3.29 in Brahmayin, 3.24 in Fulwariya, 3.11 Maritar, 3.09 in Brahmayin and minimum chlorophyll content 3.08 mg m⁻² in the Maritar. In

the Dah *Tal* maximum chlorophyll content 3.22 in the Kewtaliya and slightly maximum chlorophyll content 3.21 mg m⁻² in Chaubey Chhapra, 3.18 in Ghogha, 3.17 in Kewtaliya, 3.12 in Chaubey Chhapra, 3.05 in Ghogha, 3.04 in Duhi Musi, 2.99 in Halpur, 2.98 in Duhi Musi, 2.92 in Halpur, 2.87 in Dal Chhapra and minimum chlorophyll content in the 2.66 mg m⁻² in Dal Chhapra. The mean value of Chlorophyll content 3.52 and 3.03 in Suraha and Dah *Tal*. The similar finding has been given by Sarkar, (2016).

Number of panicles (m⁻²)

The Suraha *Tal* number of panicles (m⁻²) (Table 2) of naturally grown floating rice data ranged from 229 to 239 and Dah *Tal* number of panicles (m⁻²) of naturally grown floating rice data ranged from 210 to 224. In the Suraha *Tal* maximum number of panicles 239 m⁻² in Basantpur and Suryapura and slightly maximum number of panicles 235 m⁻² in the Maritar, 232 in Brahmayin, 230 in Shivpur, and minimum number of panicles 229 m⁻² in Fulwariya. In the Dah *Tal* maximum number of panicles 224 m⁻² in Halpur and slightly maximum number of panicles 220 m⁻² in Ghogha, 218 in Chaubey Chhapra, 217 in Kewtaliya, 212 in Duhi Musi and minimum number of panicles 210 m⁻² in Dal Chhapra. The mean value of number of panicles 234 and 216 m⁻² in Suraha and Dah *Tal*. Similar finding was also reported by Mai., *et al.* (2021).

Number of grains panicles (°)

The Suraha *Tal* number of grain panicle⁻¹ (Table 2) of naturally grown floating rice data ranged from unfilled 137 to 151 and filled 116 to 129 and Dah *Tal* number of grain panicle⁻¹ of naturally grown floating rice data ranged from unfilled 113 to 124 and filled 99 to 105. In the Suraha *Tal* maximum number of grain panicles⁻¹ unfilled 151 and filled 129 in Basanpur and slightly maximum number of grain panicles⁻¹ unfilled 145 and filled 124 in the Shivpur, unfilled 143 and filled 123 in Fulwariya, unfilled 142 and filled 122 Suryapura, unfilled 138 in Brahmayin and filled 117 in Maritar and minimum number of grain panicles⁻¹ unfilled 137 in Maritar and filled 116 in Brahmayin. In the Dah *Tal* maximum Number of grain panicles⁻¹ unfilled 124 in Ghogha and filled 105 in Ghogha and Dal Chhapra and slightly maximum Number of grain panicles⁻¹ unfilled 121 and filled 105 in the Kewtaliya and Dal Chhapra, unfilled 120 and filled 104 in Halpur and Kewtaliya, unfilled 118 in Dal Chhapra and filled 102 in Halpur, unfilled 116 and filled 101 in Duhi Musi and minimum Number of grain panicles⁻¹ unfilled 113 in Duhi Musi and filled 99 in the Chaubey Chhapra. The mean value of number of

panicles 142.6 and 121.8 in Suraha *Tal* and 22 in and Dah *Tal*. The similar finding has been given by Pradhan., *et al.* (2021) [2].

Panicle length (cm)

The Suraha *Tal* panicle length (cm) (Table 2) of naturally grown floating rice data ranged from 23.7 to 25.2 and Dah *Tal* panicle length (cm) of naturally grown floating rice data ranged from 23.3 to 23.7. In the Suraha *Tal* maximum panicle length 25.2 cm in Basantpur and slightly maximum panicle length 24.4 in the Suryapura, 24.3 in Maritar, 23.9 in Shivpur, 23.3 in Fulwariya and minimum panicle length 23.7 in Brahmayin. In the Dah *Tal* maximum panicle length 23.7 in Duhi Musi and slightly maximum panicle length 23.6 cm in Ghogha, Kewtaliya and Chaubey Chhapra, 23.4 in Halpur and minimum panicle length 23.3 cm in Dal Chhapra. The mean value of panicle length 24.2 and 23.5 cm in Suraha and Dah *Tal*. The similar finding has been given by Pradhan., *et al.* (2021).

Test weight (g)

The Suraha *Tal* test weight (g) (Table 2) of naturally grown floating rice data ranged from 21.3 to 23.6. The Dah *Tal* test weight (g) of naturally grown floating rice data ranged from 21.0 to 23.1. In the Dah *Tal* maximum test weight 23.1 g in Ghogha and slightly maximum test weight 22.7 g in the Kewtaliya, 22.4 in Halpur, 21.6 in Duhi Musi, 21.4 in Dal Chhapra and minimum test weight 21.0 in Chaubey Chhapra. The mean value of test weight 22.7 and 22.0 g in Suraha and Dah *Tal*. The similar finding has been given by Pradhan., *et al.* (2021).

Grain length (mm)

The Suraha *Tal* grain length (mm) (Table 2) of naturally grown floating rice data ranged from 6.03 to 6.13. The Dah *Tal* grain length (mm) of naturally grown floating rice data ranged from 6.05 to 6.12. In the Dah *Tal* maximum grain length 6.12 mm data in Dal Chhapra and slightly maximum grain length 6.10 mm data in the Halpur, 6.09 in Duhi Musi, 6.07 at Kewtaliya, 6.06 at Ghogha and minimum grain length 6.05 mm in the Chaubey Chhapra site of village.

Grain breadth (mm)

The Suraha *Tal* grain breadth (mm) (Table 2) of naturally grown floating rice data ranged from 2.20 to 2.26 and Dah *Tal* grain breadth (mm) of naturally grown floating rice data ranged

from 2.16 to 2.23. In the Suraha Tal maximum grain breadth 2.26 mm data in Basantpur and slightly maximum grain breadth 2.25 mm data in the Suryapura, 2.24 at Shivpur, 2.22 in Mritar, 2.21 in Brahmayin and minimum grain breadth 2.20 mm data in Fulwaria. In the Dah Tal maximum grain breadth 2.23 mm data in Halpur and slightly maximum grain breadth 2.21 mm data in the Ghogha, 2.20 in Kewtaliya, 2.19 in Dal Chhapra, 2.17 in Duhi Musi and minimum grain breadth 2.16 mm at Chaubey Chhapra site village.

Grain yield (q/ha)

The Suraha Tal grain yield (q ha⁻¹) (Table 2) of naturally grown floating rice data ranged from 38.79 to 47.96. The Dah Tal grain yield (q ha⁻¹) of naturally grown floating rice data ranged from 36.30 to 41.65. In the Suraha Tal maximum grain yield 47.96 q ha⁻¹ in Basantpur and slightly maximum grain yield 46.16 q ha⁻¹ in the Shivpur, 44.77 in Maritar, 44.60 in Suryapura, 43.98 in Fulwaria and minimum grain yield 38.79 q ha⁻¹ in Brahmayin. In the Dah Tal maximum grain yield 41.65 q ha⁻¹ in Ghogha and slightly maximum grain yield 41.09 q ha⁻¹ in the Duhi Musi, 40.08 in Halpur, 39.26 in

Dal Chhapra, 38.34 in Kewtaliya and minimum grain yield 36.30 q ha⁻¹ in Chaubey Chhapra village site. The mean value of grain yield 44.37 and 39.45 q ha⁻¹ in Suraha and Dah Tal. The similar finding has been given by Nguyen., *et al.* (2015) [3]. [4-13].

Straw yield (q/ha)

The Suraha Tal straw yield (q ha⁻¹) (Table 2) of naturally grown floating rice data ranged from 46.38 to 57.07. The Dah Tal straw yield (q ha⁻¹) of naturally grown floating rice data ranged from 42.22 to 47.21. In the Suraha Tal maximum straw yield 57.07 q ha⁻¹ at Basantpur and with small variation of grain yield 54.88 q ha⁻¹ at the Maritar, 54.14 at Shivpur, 53.69 at Fulwaria, 53.47 at Suryapura and minimum grain yield 46.38 q ha⁻¹ in Brahmayin. In the Dah Tal maximum straw yield 47.21 q ha⁻¹ at Ghogha and slightly maximum straw yield 46.41 q ha⁻¹ at the Duhi Musi, 46.13 at Halpur, 44.69 at Kewtaliya, 43.80 at Dal Chhapra and minimum straw yield 42.22 q ha⁻¹ at Chaubey Chhapra village. Chaubey Chhapra village (Dah Tal). The mean value of grain yield 53.02 and 45.07 q ha⁻¹ in Suraha and Dah Tal.

Suraha Tal (Village)	04-08-2022		24-08-2022		14-09-2022		04-10-2022		24-10-2022		14-11-2022		04-12-2022		24-12-2022	
	(20 days)		(40 days)		(60 days)		(80 days)		(100 days)		(120 days)		(140 days)		(160 days)	
	Wa- ter depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height
	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)
Basantpur	26.8	32.3	35.6	40.5	60.8	71.2	145.2	156.6	212.6	226.8	255.6	265.8	290.2	307.7	325.6	343.7
Shivpur	25.5	29.3	34.8	37.6	62.6	69.6	142.3	153.5	210.7	222.3	253.2	263.5	289.2	304.8	323.8	338.2
Suryapura	25.2	29.5	36.3	38.7	58.5	68.5	144.5	154.4	211.6	223.8	252.4	262.8	287.6	303.6	324.3	338.8
Mairitar	28.5	30.2	35.8	39.2	61.5	70.9	146.8	155.8	213.7	224.5	255.8	266.2	291.8	306.2	326.5	342.5
Fulwariya	24.8	28.5	34.8	37.2	58.7	68.4	140.0	151.2	208.6	220.5	250.7	260.2	285.4	300.2	320.8	335.7
Brahmayin	24.2	27.6	30.8	34.2	57.5	57.2	138.8	149.8	207.0	217.5	248.2	258.5	284.2	297.6	318.8	334.2
Mean	25.8	29.5	34.6	37.9	59.9	67.6	142.9	153.5	210.7	222.5	252.6	262.8	288.6	303.3	323.3	338.8

Dah <i>Tal</i> (Village)	07-08-2022 (20 days)		27-08-2022 (40 days)		17-09-2022 (60 days)		07-10-2022 (80 days)		27-10-2022 (100 days)		17-11-2022 (120 days)		07-12-2022 (140 days)		27-12-2022 (160 days)	
	Wa- ter depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height	Water depth	Plant height
	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)
Ghogha	22.5	25.8	32.8	35.7	50.2	65.2	135.5	144.2	200.5	215.2	240.2	255.8	286.2	302.4	305.6	325.8
Halpur	23.4	26.5	31.5	34.5	48.6	62.5	131.7	142.5	198.0	214.2	238.2	254.0	284.0	300.8	303.2	326.7
Kewtaliya	22.8	25.7	30.8	34.2	49.3	63.2	136.0	147.6	197.0	212.6	237.5	253.6	282.7	299.6	302.7	325.4
Duhi Musi	24.6	27.3	31.2	34.6	48.2	62.7	130.5	141.3	195.2	210.8	235.5	252.2	280.7	297.5	303.7	324.6
Dal Chhapra	21.8	25.5	30.2	34.8	46.5	61.3	133.6	144.8	194.0	208.6	234.0	251.8	281.5	298.7	304.6	324.0
Chaubey- Chhapra	23.3	27.2	30.4	33.8	45.4	59.9	129.4	140.2	192.6	206.4	230.5	248.6	279.2	295.3	300.6	322.8
Mean	23.6	26.3	31.1	34.6	48.0	62.4	132.7	143.7	196.2	211.3	235.9	252.6	282.3	299.0	303.4	324.8

Table 1: Water depth and plant height of naturally grown floating rice of Suraha *Tal* and Dah *Tal* land of Ballia district.

Suraha <i>Tal</i> (Village)	Number of tillers hill ⁻¹	Cholorophyll content (mg m ⁻²)	Number of panicles m ⁻²	Number of grain panicle ⁻¹		Panicle length (cm)	Test weight (g)	Grain yield (q ha ⁻¹)	Straw yield (q ha ⁻¹)	Grain length (mm)	Grain breadth (mm)
				Grain Unfilled	Grain Filled						
Basantpur	35	4.03	239	151	129	25.2	23.6	47.96	57.07	6.13	2.26
Shivpur	31	3.65	230	145	124	23.9	23.2	46.17	54.14	6.06	2.24
Surypura	29	3.63	239	142	122	24.4	22.6	44.60	53.47	6.11	2.25
Maritar	32	3.09	235	137	117	24.3	23.3	44.77	54.88	6.05	2.22
Fulwaria	34	3.58	229	143	123	23.8	22.2	43.98	53.69	6.03	2.20
Brahmayin	30	3.19	232	138	116	23.7	21.3	38.79	46.38	6.10	2.21
Mean	31.8	3.52	234	142.6	121.8	24.2	22.7	44.37	53.2	6.08	2.23
Dah <i>Tal</i> (Village)	Number of tillers hill ⁻¹	Cholorophyll content (mg m ⁻²)	Number of panicles m ⁻²	Number of grain panicle ⁻¹		Panicle length (cm)	Test weight (g)	Grain yield (q ha ⁻¹)	Straw yield (q ha ⁻¹)	Grain length (mm)	Grain breadth (mm)
				Grain Unfilled	Grain Filled						
Ghogha	26	3.11	220	124	105	23.6	23.1	41.65	47.21	6.06	2.21
Halpur	25	2.95	224	120	102	23.4	22.4	40.08	46.13	6.10	2.23
Kewtaliya	23	3.19	217	121	104	23.6	22.7	38.34	44.69	6.07	2.20

Duhi Musi	26	3.02	212	116	101	23.7	21.6	41.09	46.41	6.09	2.17
Dal Chhapra	28	2.76	210	118	105	23.3	21.4	39.26	43.80	6.12	2.19
Chaubey Chhapra	27	3.16	218	113	99	23.6	21.0	36.30	42.22	6.05	2.16
Mean	25.8	3.03	216.8	118.6	102.6	23.5	22.0	39.45	45.07	6.08	2.19

Table 2: Growth and yield attributes of naturally grown floating rice of Suraha *Tal* and Dah *Tal* land of Ballia district.

Conclusion

Naturally grown floating rice in Suraha *Tal* and Dah *Tal* were growth and water productivity in newly opened *Tal* lands rice indicated that water pounding layer affected the plant height, number of tillers, chlorophyll content, number of panicles, number of grain panicle⁻¹ unfilled and filled, panicle length, test weight, grain yield, straw yield, grain length and grain breadth rice grain and water productivity. At that condition increasing the water depth was found to increase plant height, but the other parameters of growth and yield were also influenced as number of tiller and grains. In long term, surface irrigation water network can be managed properly for surrounding area to save water and increase yield in *Tal* lands floating rice.

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