Bangladesh Rice J. l0(1&2) : 1-11. 2001

Farm Resource Optimization and Cropping Plan for Farmers in Deep Thbewell Irrigated Area in Bangladesh

F I M Golam Wahed Sarker! and John Lingard?

ABSTRACT

This study was undertaken in an area of Bangladesh to assess the impact of minor irrigation on different farm sizes and determines the optimum allocation of resources of large and small farmers among different crops in a deep tube well (DTW) irrigation system. A survey of farms was used to provide data to develop linear programming representative farm models. The analysis took into account crop activities. inputs used. farm size and soil types. Optimal plans show a misallocation of existing resources and there is considerable scope for increasing farm income by reallocation of existing resources. The misallocation of resources on large farms was greater than on small farms. The analysis suggests that by reallocating existing resources, large farms can increase farm income and employment more significantly than small farms. The research supports the view that the government should maintain a policy that favors private sector investment and operation or DTW irrigation equipment and the extension workers should direct farmers to better allocate their resources.

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Energy Input and Output for Production of Boro Rice in Bangladesh

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ABSTRACT

The present study was carried out to find the energy inputs requirement such as labor/powcr and materials for production of Boro rice in different categories of farms in selected areas and to determine the output energy obtainable from the crop yield. In total, 136 fanners were selected under different categories and interviewed on designed and pre-tested questionnaire for data collection on energy use. The farmers were categorized as landless (0.20 ha), marginal (0.21-0.61 ha), small (0.61-1.00 ha), medium (1-2 ha) and large (2.0 ha). The input energy for landless, marginal, sI11:III, medium and large farmers were 31936, 30458, 26688, 29394 Ml/ha and 2787<'. and the output energy were 115728, 119528, 114616, 115444 and 112985 MJ/ha, respectively. The output-input energy ratio in respective categories was 3.6, 3.9,4.14,3.93 and 4.05. It was also found that power tiller (PT) fanning was the most efficient farming method. The energy ratio was high in PT farming which was 4.()~.

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Effects of Supplemental Irrigation and Variety on the Performances of HYV Rice Grown under Upland Conditions

M M Husain '

ABSTRACT

Upland Aus rice is grown on about 0.85 million hectares of land in Bangladesh. Drought and salinity limit the adoption of high yielding variety (HYV) rice in the coastal areas. Two field experiments were conducted at the Bangladesh Rice Research Institute Regional (BRRI) Regional Station, Sonagazi. Feni to investigate the effects of supplemental irrigation and varieties on the growth and yield of several HYV upland rice grown under saline soil conditions in the 1999 and 2000 Aus seasons. Soil salinity in the irrigated and rainfed plots was very similar ranging from 5 to 7 *dS/m* during the sowing to early tillering stages. Supplemental irrigation increased grain yields by 15-20%. In 1999, BRRI dhan27 gave the best yield of about 3 t/ha, which was about 30% higher than those of HYV BR24 and Binnatoa. a local check variety. In 2000, BR9 and BRRI dhan27 gave yields of 4.18 and 3.67 tlha respectively, which were about 85% and 65% higher than that of Binnatoa. It is concluded that HYV rice could be grown in the upland moderate saline soil conditions of the southeast coastal region by using supplemental irrigation at the beginning of the season.

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Effect of Urea-N and *Sesbania* Dried Biomass on Yield and Yield Attributes of BR23: A Late Transplanted Aman Variety

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ABSTRACT

A field experiment was conducted to determine the amount and time of urea application on BR23 under rain fed condition when basal application of *Sesbania* dried biornass (SOB) is used. The treatments were: T 1- control (0 N); Tr S0 kg N/ha applied at 15.30.45 OAT: T_3- SOB (@ 4 t/ha alone: T_4- SOB (@ 4 t/ha + S0 kg N/ha at 15, 30, 45 OAT; T 5- SDB (@ 4 r/ha + 40 kg N/ha at 15. 30, 45 OAT; T 6- SOB (@ 4 t/ha + 40 kg N/ha at 30.45 OAT: *TT:* SOB (@ 4 t/ha + 40 kg N/ha at 30 OAT and T 8- SOB (4 t/ha) + 40 kg N/ha at 45 OAT. The highest grain yield (5.82 t/ha) was obtained from T4 which was contributed from higher panicles/m^2 (28ti). higher dry matter (OM) production (944 *glm2)* and higher filled grains/panicle. Grain yield was positively correlated with leaf area index (LA!) (0.882**), straw yield (0.980**), filled grains/panicle (0.745*), panicks/m^2 (0.97ti**J. and total OM (0.904'") at 60 days after transplanting (OAT). Straw yields were proportional to the corresponding grain yields. The results suggested that SOB @ 4 t/ha might be a supplement for 40 kg urea N/ha and at or after 30 OAT was the appropriate time for urea topdress when basal application of SOB is used.

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Influence of Planting Time, Seedling Age and Planting Density on the Performance of Photoperiod Sensitive Rice

M M Husain ı and M A Islam[2]

ABSTRACT

Field experiments were conducted to determine the effects of transplanting date. spacing and seedling age on yield ofT. Aman rice under adverse coastal conditions of Sonagazi during 1996 and 1997. Seedling age and time of planting influenced grain yield significantly. Fifteen September planted crops of BR22 gave 2.8 t/ha which was about 65% higher than those of I October planted crops in 1996. The equivalent yield in 1997 was 3.0 t/ha. about 75% higher than that of I October planting. Higher grain yield of 15 September planted crops was attributed to a higher total dry matter (TOM) production and higher harvest index (HI). The results suggested that for late planted crops, older seedling of up to 60 day, would give better yield than younger seedlings. Grain yields were strongly correlated with the number of grains/panicle and **HI.** It is concluded that under the adverse soil and climatic conditions of Sonagazi. BR22 can be transplanted up to end of September for yields of around 2 t/ha.

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Economic Performance of Different Power Threshers for Rice

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ABSTRACT

Threshing is considered to be an important operation in rice production. Use of appropriate power thresher may result in reduced post-harvest loss of paddy. Five different power threshers including one "hold-on" and four "throw-in" types were tested for their comparative performances and economics during T. Aman, 1999. BRRI Open-drum, BRRI TH-8, BRRI TH-7, CCK and BARI threshers were evaluated for threshing paddy harvested at three straw lengths, 70, 95 and 110 cm. Threshing costs for Open-drum, TH-8. TH-7. CCK. BARI power threshers and manual threshing were 459, 936, 1066, 1233, 1183 and 1536 Tk/ha, respectively. The equivalent threshing times were 11.10, 19.57,20.06,25.67,34.09 and 68.29 hr/ha, respectively. About 70% cost was saved using Open-drum thresher compared to TH-8, TH-7, CCK and BAR I thresher. Labor saving was also the highest for Open-drum thresher, about 84% compared to TH-8, TH-7, CCK and BARI thresher. The break-even levels of BRRI Open-drum, TH-8, TH-7, CCK and BARI thresher were 1.5,5.0,2.75,7.0 and 3.0 ha, respectively. Break-even analysis showed that the BRRI Open-drum thresher was the most appropriate one for fanners having even 1.5 ha of land.

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Effect of Pre-sowing Seed Soaking Treatment on Germination and Seedling Growth of some Upland Rice as Affected by Water Stress

J K Biswas, A R Gomosta and R Yasmeen!

ABSTRACT

An in-vitro study was conducted to ascertain the influence of pre-sowing water soaking of seeds and simulated water stress on the germination and seedling growth of some upland rice varieties. Seeds of BR21. BR24. Dharial, Kaishapanja and Hashikalrni were soaked in distilled water for 0, 24 and 48 hours and were allowed to germinate in PEG600 solutions simulating 0-2.5 and -5.0 bar tension for 10 days. The seeds soaked for 24 or 48 hours showed quite good and similar germination ability at -2.5 bar water tension. The seeds not soaked barely germinated under stress conditions (-2.5 or -5.0 bars). Germination, shoot and root lengths of pre-sowing soaked seeds were affected more adversely in -5.0 bar tension than in -2.5. Root length appears to be more sensitive than shoot length. Pre-sowing seed soaking may help in good crop establishment under moderate water stress condition.

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Adoption of Selected Recommended Practices of BRRI dhan27 in Tide Prone Non-saline Area

M A I Khan, M A Rashid, M A Muttaleh, M S Hossain I

ABSTRACT

Adoption status of selected recommended practices of BRRI dhan27 and relationship between those practices and selected fanners' characteristics were investigated. Data were collected from 102 fanners 01" Patuakhali district during January and February 2000 with a pre-tested questionnaire. It was found that 25% 01" the farmers were in high. 65% in medium and 10% in low adoption groups. Among the adoption of selected recommended practices. spacing ranked first followed by seedling/hill. urea fertilizer. top dressing. weeding and seedling age. The lowest adoption rate was found with insect control measures. Majority of the fanners faced difficulty in threshing by leg or hand beating. Farm size and annual income of the farmers had significant and positive relationship with their adoption of recommended practices of BRR! dhan27.

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Problem Confrontation of the Farmers in Modern Aus Rice Cultivation in Tidal Non-saline Ecosystem

M A Rashid, M A Muttaleb, M A I Khan and M S Hossain I

ABSTRACT

A study was conducted in three villages of Babuganj upazila under Barisal district to know the extent of problem faced by the farmers in modern Aus rice cultivation and to explore the relationship of the selected characteristics of the farmers with their problem confrontation. Data were collected from randomly selected 96 fanners using pre-tested questionnaire. It was found that 40.63% of the farmers had high and 38.54% had medium problem confrontation in modern Aus rice cultivation. Lack of suitable varieties, high price of fertilizer, lack of capital, lack of quality MV seed, insect infestation and disease infestation were the major problems faced by the farmer. Age and education of the fanners had significant positive relationship with the problem confrontation while extension contact of the farmer's showed significant negatives relationship.

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Performances of Some BRRI Varieties Planted Year Round

J C Biswas, U K Sarker and S A Sattar!

ABSTRACT

Grain yields of rice varieties vary across different agro-ecological zones. Experiment was conducted on planting rice year-round at the Bangladesh Rice Research Institute (BRRI). Regional Station. Rangpur to find out the suitability of cultivating some BRRI released varieties in 1999 and 2000. Dry matter accumulation or seedlings of BR 14 was higher than other varieties. BRRI dhan29 gave as high as 7.4 t/ha paddy yield. More than 4.5 r/hn grain yield was obtained from BRRI dhan28 and BRRI dhan32 planted in July to September. Growth duration of the rice varieties transplanted in December and January was about 30 days longer than that of those transplanted in March. BRRI dhan28. BRRI dhan29. BRRI dhan32 and BRRI dhan33 could be cultivated year-round with satisfactory grain yields in Rangpur region except in March to June.

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Inoculation Techniques of Growth Romoting Rhizobia for Improving Nitrogen Uptake and Yield of Lowland Rice

J C Biswas ' and J K Ladha?

ABSTRACT

Inoculation techniques in lowland rice *(O/FtI sativa* L.) with growth-promoting rhizobia were investigated under greenhouse conditions. *Rhirobium leguminosarum* bv *trifolii* EI2 and *Bradvrhizobium* sp IRBG:!7! were used as seed, soil and seedling inoculation. As high as 19% increased N uptake was estimated in inoculated plants compared to inoculated control. Similarly increased P and K uptake was observed because of inoculation compared to control. In seedling inoculation, Fe uptake was consistently and significantly higher with both the strains inoculated. Grain yield increased by 9-25% and that of straw by 14-37% following rhizobial inoculation. Consistently higher grain yield was recorded in soil inoculation with strain E 12. Straw yield was higher with strain IRBG271 irrespective of inoculation techniques.

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Alternative Water Distribution System in a Selected Deep Tubewell Site an Economic Evaluation

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M T Islam ı and M N Islam '

ABSTRACT

This study was undertaken to assess the economic feasibility of polyvinyl chloride (PVC) pipe and plastic pipe (PP) water distribution system and its effects on command area development. irrigation time saving and minimizing water losses. In the system. discharge of the selected Deep tubewell (DTW) was delivered in two or three directions by earthen channel. which occurred huge amount of water loss. decrease command area and increase irrigation time and costs. To overcome those problems DTW discharge was diverted in two or three directions using PVC and PP of different lengths and diameters. The conveyance loss was 2.80-9.50% in PVC and PP system compare to 30% in earthen channel which demanded improved distribution systems. By using PVC and PP distribution system about 81 % of irrigation water could be saved over earthen channel. By introducing the alternative water distribution system about 37% command area could be increased. The economic analysis of the alternative water distribution system was highly economical considering the benefit-cost ration (BCR). internal rate of return (IRR) and sensitivity analysis. BCR of the system varied from 2.74 to 1.43 on the basis of 15-45% discount rate and the calculated IRR was above 50%.

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Chances of Drought in Transplanted Aman Rice Cultivation in Barind Area

M T Islam I, L R Khan[2] and M Maniruzzaman-'

ABSTRACT

The nature, extent and frequency of droughts in the monsoon season (T. Aman season) were analyzed in the Level Barind area of northwest region of Bangladesh using the method of water balance from long-term (\965-95) rainfall data. Probability analysis of rainfall was done using Gamma distribution. The analysis showed that in the study area droughts are expected at the beginning of the crop season prior to transplantation and from the beginning of the ripening period. Analysis also showed that IS-day and 20-day droughts were expected during ripening stage in an average year (ie, 50% probability) and once in 5 years (ie 20% probability), respectively. But a seasonal maximum of 20-day drought during total growing period was expected once in 3 years (ie. *33'k* probability). The return period of20-day drought being exceeded in next 15 years during crop season is 33 years.

Bangladesh Rice J. 10(1&2): 83-94, 2001

Evaluation of Rice Genetic Resources Based on Light Interception and Light Extinction Coefficient

M S I Mamin I, A Hamid[I], M M Haque I, N I Bhuiyan- and A Karim '

ABSTRACT

Two studies were conducted at Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU)' Salna, Gazipur. Bangladesh under wetland conditions to identify rice genotypes capable of supplying sufficient light to the lower canopy profile during grain filling period to increase net photosynthesis and yield. The study included 66 and 69 rice genotypes, respectively in 1999 and 2000. The fraction of radiation intercepted hy the canopy was determined by measuring incident PAR (photosynthetically active radiation) above and below the canopy by suntlec ceptometer, a I m long light quantum sensor, at around II to 13 hours. BRRI dhan29 was identified as the most potential genotype, in respect of canopy architecture and capable of maintaining the supply of sufficient light to the lower canopy profile followed by BRRI dhan32. In addition. KK 11, Unknown 78. BR 10 and Kamarga chikon might also be considered as potential genotypes.

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Flowering Response of Mizuho and IR8 Rice Cultivars at Different Photoperiod

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ABSTRACT

A POI experiment was conducted to determine photoperiod sensitivity of rice *(OrYZII sativa* L.). Optimum and critical day lengths, photoperiod sensitive and basic vegetative phases of Mizuho and lR8 cultivars were determined. Optimum day length for Mizuho and IR8 was found 9-11 and 9 hours. respectively. Critical day length was over 14 hours and photosensitive phase was more than 94 days for Mizuho. Basic vegetative phase (BVP) for Mizuho and lR8 was found 30 and 65 days, respectively. At controlled photoperiod, tillering was reduced and the plants that have flowered earlier due to short day treatment exerted less number of leaves compared to late tlowering plants under longer/natural photoperiod.

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Evaluation of Rice Genetic Resources Based on Leaf Nitrogen Content

M S I Mamin ', A Hamid ı, M M Haque[l], N I Bhuiyan/ and A Karim '

ABSTRACT

Two studies were conducted at Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Salna, Gazipur, Bangladesh under wet land condition to identify potential rice genotypes capable of maintaining higher leaf N content. The study included 66 and 69 rice genotypes respectively in 1999 and 2000. A standard linear regression line for leaf N content against SPAD (Soil-Plant Analysis Development) values was developed. Leaf N contents were determined from SPAD values at mid tillering (MT), panicle initiation (PI), flowering (FL) and maturity stages which were used in hierarchical cluster, step-wise discriminant function analysis and Mahalanobis distances (D2) analysis for identifying potential genotypes. Genotype numbered 53 (Unknown collection numbered 78); a local collection from Rajshahi had higher leaf N content. In addition, BR I 0, BR22, BRRI dhan32 and Kamarga chikon (genotype 11) might also be considered as potential genotype for higher leaf N content.

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Participatory Variety Selection of Deepwater Rice in Faridpur Region

M S H Hawlader ', B K Sarkar- and M H Kabir-

ABSTRACT

Participatory variety selection (PVS) is the selection procedure of developed or nearly developed varieties by fanners in their own fields using their own selection criteria. PVS trials of deepwater rice (DWR) were conducted at Tupuria, Kotalipara upazila, Gopalganj and Maligram, Bhanga upazila. Faridpur in 1999 and Hamirdi, Bhanga upazila. Faridpur and Basagari, Nagarkanda upazila. Faridpur in 2000. Grain yield of standard check varity, Hbj A VIII, was the highest (2.6 t/ha) at Tupuria while the yield of BR224-2B-2-5 was the highest (:l.4 t/ha) at Maligram. Grain yield of Laxmidigha was 2.5 and :l.0 t/ha at Tupuria and Maligrarn. respectively. Fanners preferred Laxmidigha (ck.) than the highest yielding standard variety/advanced line mainly because of early maturity and taste. In 2000, yield of Hizoldigha (ck.) was substantially less than PCR891114-B-R-2-2-2-1 (2.8 t/ha) at Hamirdi. Similarly, yield of IR64588-47-l-2-2B-9-2-3-3 (2.0 t/ha) was more than double than that of Hizoldigha (0.8 t/ha) at Basagari. The local cultivars matured earlier than tested lines at all the locations. Late maturing test entries suffered severely from insects and vertebrate pests. Synchronization in maturity of test varieties/lines with local culrivars and the taste of the boiled rice were very important for DWR variety selection in Faridpur region. The farmers selected none of the tested varietiesllines. Hence, concerted efforts are required to integrate participatory approaches in DWR variety development.

Bangladesh Rice J. IO(1&2) : 115-118. 200 I

A Comparative Study between Hand Seeding and Mechanical Seeding for Lowland Rice in Bangladesh

M S Islam ı, M A Baqui-, D Ahmad ', M M Rahman'' and M A Rahman>

ABSTRACT

Experiments were conducted to determine the field performances and economic suitability of seeding techniques for lowland rice culture in Bangladesh. The drum seeder was tested at 60 and 80 kg ha-I seed rates: however the seed rate for hand broadcasting was 100 kg ha-I. The field capacity of hand broadcasting was 1.5 times higher than seeding by drum type seeder. The field efficiency of machine seeding ranged from 70 to 80% and it was 90% for hand broadcasting. In machine-seeded field. the crops were grown in rows that favored weeding operation by rotary type weeder. On the contrary, in hand broadcasted field, the crops were not grown in rows and hence. the weeding operations were done by traditional implements. The partial budget analysis for the costs of revealed that a shift from manual practice to the mechanical practice for seeding and weeding operations could earn a net benefit of Tk *2667*/- per hectare in Bangladesh situation.