**2.6 Seeding rate**

Seeding rate can be defined as the amount of seeds required toacieve the adequate seedling density in the nursery bed or the field (Louisiana, 2009). Better seeding density is an important factor to consider among the components of nursery management practices for vigorous plant growth (Lal and Roy, 1996).

The seeding rate applied for the nursery trays depends on the variety and the germination percentage. The seedling density is decided according to the seeding rate applied and it eventually decided the requirement of nursery trays for the field establishment(Islam and Khan, 2017; Saiful Islam et al., 2015)**.** So, it is important to have an optimum seeding rate to use in the nursery trays used for the machine transplanting to optimize the yield in a cost-effective manner. The seeding rate which is applied for the nursey trays ranged from 60g – 150g seeds per tray (Alizadeh et al., 2011; Columbia and Division, 2013; Islam et al., 2016; Islam and Khan, 2017; Saiful Islam et al., 2015)

The seeding rate is having an influence naturally on the growth and the density of seedlings in the nursery. The thin sowing seeds give strong, vigorous, tillered seedlings that can withstand over the adverse climatic conditions with better stand of plants after field establishment whereas the thick sowing produced thin, tall, weak seedlings without tillers that susceptible highly for the transplanting shock which retarded the growth of plants after field establishment (Hossain et al., 2002; Oparka and Gates, 1982; Sarwar et al., 2014).

The farmers tend to use high seed rate in the nursery on behalf of avoiding the weed competition and make it easy for uprooting the seedlings for transplanting. The uprooting of seedlings and separation of them for transplanting, is the most critical process at which the root damages occurred. The proportion of roots damaged is increasing with the seed rate which is considered as the major reason for the transplanting shock that adversely effect on the early plant growth of the plants after established in the field. As the early plant growth is one of the main contributors on the final grain yield the optimum seed rate for the nursery trays is an important factor to consider at nursery establishment (Lal and Roy, 1996; Panda et al., 1991; Sarwar et al., 2014; Singh et al., 2005). According to the Islam et al., 2015 the number of seedlings which are dispensed per stroke, the amount of missing hills and the uniformity in the establishment of seedlings in the machine transplanting depends on the seeding rate used in nursery trays.

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**The amount of seed was 130g (dry) and 150g (sprouted) per tray. Tray soil**

**The number of seedlings per hill in rice transplanter increased from 1.7 to 2.8 as the seeding rate increased from 60 to 100 g per tray. The missing hills decreased from 13.32 to 7.65 % with increasing seeding rate from 60 to 100 g per tray**

**total cost of transplanting in the treatments of T2, T3 and T4 was decreased by 19.20, 22.44 and 25.70%, respectively as compared to hand transplanting** Techno-Economic Performance of a Self-Propelled Rice Transplanter and Comparison with Hand Transplanting for Hybrid Rice Variety

**60, 80 and 100 g per tray.** Techno-Economic Performance of a Self-Propelled Rice Transplanter and Comparison with Hand Transplanting for Hybrid Rice Variety

**number of seedlings per hill in rice transplanter increased from 1.7 to 2.8 as the seeding rate increased from 60 to 100 g per tray. The average number of seedlings per hill in rice transplanter was obtained to be 2.2 compared to 1.1 in hand transplanting.**

Techno-Economic Performance of a Self-Propelled Rice Transplanter and Comparison with Hand Transplanting for Hybrid Rice Variety**60**

**The seed rate per tray for mechanical transplanting was 130-140 gm dry seed.** Techno-economic performance of 4-row self-propelled mechanical rice transplanter at farmers field in Bangladesh

**Rice plants significantly reduce the yield after transplanting seedlings grown at higher seed rate as compared to seedlings grown with low seeding density (Singh et al., 1987).**

**Mostly farmers use high seed rates in the nursery to avoid weed competition and to uproot seedlings easily, but they don’t realize its effect after transplanting in main field**

**Transplanting shock was also higher in older seedlings grown with high seed rate due the more root damage during up- rooting, as separation of seedlings caused maximum root damage during uprooting and at the time of transplanting in main field. Our results are in line with the explanations of some previous studies (Singh et al., 2005; Lal and Roy, 1996; Panda et al., 1991)**

**who reported that seedlings grown with low seed rate and with fertilizer application increased vigor, showing a better stand in main field after transplanting and ultimately effected growth and yield of rice crop**

Influence of Nursery Management and Seedling Age on Growth and Economic Performance of Fine Rice

**seeds or 4 seed /m2. When farmers direct seed their crops, only 10‐20% of the seeds sown will actually established. In a nursery, this may increase to 40‐50%.**

Rice Production Manual

**The seed rate naturally influences the growth of the seedlings. Thin sowing gives strong and tillered seedlings, whereas thick sowing provides thin and tall seedlings without tillers. Thin sowing in nurseries is always better and it will produce strong and sturdy seedlings, which can withstand adverse climatic conditions better and produce better yields. Therefore,**

(Oryza sativa

**and BRRI dhan48 were transplanted in the farmer’s field by mechanical rice transplanter and compared with hand transplanting. Seedlings density was reduced at the seed rate higher than 145 gm tray-1 indicating higher seed rate increased the seedlings mortality. Seedlings mat prepared**

**in the farmer’s field by mechanical rice transplanter and compared with hand transplanting. Seedlings density was reduced at the seed rate higher than 145 gm tray-1 indicating higher seed rate increased the seedlings mortality. Seedlings mat prepared by the farmers were varied in seedling height, density and color due to management skill of the**

Effect of row spacing of Rice transplanter on seedling requirement and grain yield

**Seed rate applied by the respective farmers was ranged from 125 to 150 gm tray-1. Seedlings density depended on the seeding rate, germination and uniform placement of seed during tray preparation. Seedlings density followed increasing trend with the increase in seed rate up to 145 gm tray-1 (Fig. 1). Seedlings mortality increased in higher seed rate and reduced the seedling density in seedling tray (Hossen, 2016). The amount of seed used in tray preparation varied depending on the variety and germination rate. Seed rate was also varied from one farmer to another due to farmer’s perception. Amount of seed used per tray by different farmers had direct influence on the seedlings density obtained per tray and consequently tray requirement in the field. Islam et al. (2015) mentioned that tray requirement, number of seedlings dispensed per stroke and missing hill during transplanting operation were subjected to the seed rate and uniformity of seedlings establishment.**

Effect of row spacing of Rice transplanter on seedling requirement and grain yield