

Agro-Advisory for Direct Seeded Rice (DSR) Amid Labour Scarcity



**Division of Agronomy, Faculty of Agriculture
SKUAST-Jammu, Chatha - 180009**

RICE CULTIVATION IN JAMMU REGION AMID LABOUR SCARCITY

GENERAL ADVISORY:

Rice is the major *kharif* crop of Jammu region grown over an area of 123'000 hectares of land. Area under rice mainly includes irrigated ecology of three districts i.e. Jammu, Samba and Kathua covering more than 80'000 hectares, including 63'000 hectares under basmati rice.

Among other challenges, the ongoing lockdown due to COVID-19 pandemic is likely to create the problem of labour scarcity in agriculture due to unavailability of migratory farm labourers. It will be very difficult to follow the existing practice of transplanted rice (TPR) cultivation over the entire available acreage. Therefore, farmers need to understand alternative scientific practices for uninterrupted rice production in Jammu region. Besides, transplanted rice (TPR), farmers can follow practices such as System of Rice Intensification (SRI), Drum Seeding of Rice in puddled and soil (DSR) and Direct Dry Seeding of Rice with Rice Seeder (DSRRS).

The choice of technique depends upon farm level conditions and resources available with farmers. The selection of technique is influenced by the time of sowing and inputs to be used in rice cultivation. Small and marginal holdings in Jammu region can be seen as blessing in disguise under present lockdown situation. Such farmers can easily employ traditional transplanted rice (TPR) technique using family labour and does not need any drastic change in their farm operations. In case, the family labour is insufficient, direct seeded rice (DSR) provides the most successful alternative to the other mentioned techniques. However, care must be taken and crucial steps need to be followed under DSR to avoid any loss. It can be practiced on a well pulverized and leveled field (Preferably laser leveled) fields for efficient results.

Stale seed bed technique is required in fields usually get infested with weeds, especially the weedy rice (Choba). This includes irrigation and ploughing of fields after harvesting the *rabi* crop to allow germination of weeds. Plough germinated weeds into the fields and wait for few days. Repeat the process at least twice before pre sowing irrigation based on soil type and weather to maintain sufficient moisture at the time of sowing.

Except light soils, this practice is recommended for all types of soils. Light soils devoid of optimum water often suffer from iron deficiency that usually appears between 4-6 weeks after germination and results in chlorosis of youngest leaf in the seedlings. However, it can be taken care of either by giving copious irrigations as soon as it appears coupled with spray of 0.5 per cent ferrous sulphate solution at weekly intervals (1 kg of ferrous sulphate solution in 200liters of water/acre).

Under DSR, 8-10 kg seed for fine and 10-12 kg for semi fine and coarse varieties of rice is sufficient for an acre of land. A higher seed rate of 12-14 kg is used in DSR carried through seed drill, zero seed drill, Kera and broadcasting methods. Seeds are required to be soaked in water containing Bavistin and Streptocycline for 10-12 hours and are to be dried in shade before sowing.

Coarse and Semi fine rice types which usually are short durations may be sown from last week of May to first week of June and fine rice types (Basmati) which are often long in duration be sown between 2nd and 3rd week of June depending upon the area and the sowing of the succeeding crop to be taken in system with rice. Preference should be given to short duration varieties. Sowing should preferably be done in the evening hours at a depth of not more than 3cm. This will help to improve germination. Apply pendimethalin through Stomp @ 1333 ml in 200 litres of water/acre as pre emergence herbicide preferably on the same day after sowing.

Full dose of recommended phosphorus (Through DAP) and Potash (Through Muriate of Potash) are to be applied during land preparation. Apply first dose of 1/3rd nitrogen through urea 21 DAS. Apply bispyrebac-sodium through Nominee Gold @100 ml or bispyrebc-sodium through Nominee Gold @100 ml + Ethoxysulfuron-ethyl through Sunrice @ 48 g in 200 liters of water/acre between 25-35 DAS. Remaining 2/3rd of nitrogen is to be applied in two equal splits between 40-45 DAS and 60-65 DAS depending upon the variety.

First irrigation is to be applied at least five days after sowing (DAS) and this duration can be extended up to 21 days depending upon the weather, soil and crop conditions. Subsequently, need based irrigation is to be applied by following the process of alternate wetting and drying on development of hair line size cracks.

The most critical input under DSR is farm machinery i.e. Rice Seeder, the absence of which may act as major limitation in adopting the technology under Jammu region. Therefore, we propose several methods for efficient implementation of DSR technique such as Rice Seeder with or without sprayer (Recommended machine for DSR) and DSR through Drum Seeder (Recommended under both puddled and un-puddled conditions).

It is an old saying that Necessity is the mother of invention. If DSR machinery is not available, farmers can also use zero seed drill, seed cum fertilizer drill etc. for sowing after calibration under the guidance of technical persons. The seed to be used is mixed either with FYM or Vermicompost coated recommended quantity of DAP of the rice variety to be sown to raise the bulk of seed to 100 kg and this bulk will suffice for sowing an area of one hectare. For example, if a farmer intends to cultivate Basmati-370, 30 kg seed has to be mixed with 45 kg DAP and 25 kg either of FYM or Vermicompost. Keep continuous vigil on the seed both in the seed drum by keeping it mixing continuously, as well as on the seed carrying pipes to prevent their choking. A plinker shall also be attached with the machine to cover the seeds. After sowing follow all the practices / procedures as have been mentioned under advisory for DSR.

If no machinery is available, farmers can go for direct seeding of rice by Kera method by opening furrows using tractor or bullock drawn plough at a spacing of 20 cm in one direction only. The bulk of seed to be used for sowing under this method shall be increased by mixing the recommended quantity of treated seeds either with FYM or Vermicompost only to raise the bulk size to 100kg. For example, in case of Basmati-370, 30 kg of seed be thoroughly mixed with 70 kg of either FYM or Vermicompost. The seeds should be sown in the furrows by Kera method. After sowing, the seeds in the furrows are to be covered by planking followed by other procedures as per the advisory for DSR.

As a last resort, broadcasting of seed in open furrows can also be done as under Kera method, provided that planking should be done in the direction perpendicular to the direction of the furrows in the field. This will help not only in proper coverage of the seed but shall also enable the seeds which are dropped on the ridges to get in to the furrows. After sowing follow all the procedures as advised for DSR.

It is noteworthy that for basmati seed production, farmers have to follow conventional technique of cultivating rice i.e. TPR. Equally important is that farmers should not allocate entire area under new practice. Keeping in view the family/locally accessible man power farmers should demarcate rice area to be cultivated through transplanting (TPR) and other alternative technique.

It is further advised that instead of sticking to monoculture of rice, farmers should resort to intra season diversification of crops by growing less labour intensive crops such as maize, pulses, til and soya bean in well drained lands not prone to water logging. Intra season diversification of crops offers a useful climate resilient strategy with less labour requirement, imperative in present situation.

DSR THROUGH RICE SEEDER

Rice Seeder is the ideal machine meant for direct seeding of rice and also fits well in the situations where there is scarcity of labour without affecting the net returns, and the crop raised with this technique rather fetches higher B: C ratio. It is the most appropriate, perfect and preferred technology for direct seeding of rice.



Rice seeder



Crop with rice seeder

PROCEDURE:

- i. Direct Seeded Rice (DSR) is the most successful alternative to Transplanted rice (TPR) under scarcity of labour without incurring losses.
- ii. Adopt Stale seed bed technique in the fields which are usually infested with weeds, especially weedy rice. It is done by irrigating the field after harvesting the *rabi* crop and

then ploughed to allow the weeds to germinate. Plough the germinated weeds in the field and allow this situation as such for few days. Repeat this process at least twice before pre sowing irrigation.

- iii. Plan pre sowing irrigation keeping in view the soil type and current climatic conditions as the field should preferably contain sufficient moisture at the time of sowing.
- iv. Except light soils, this practice is recommended for all types of soils. Light soils devoid of required water availability often suffer from deficiency of iron (Chlorosis of youngest leaf in the seedlings which usually appears between 4-6 weeks after germination). However, it can be taken care of either by giving copious irrigations as soon as it appears coupled with spray of 0.5 per cent ferrous sulphate solution at weekly intervals (1 kg of ferrous sulphate solution in 200 liters of water/acre).
- v. Requires well pulverized and leveled field (Preferably laser leveled) for efficient results.
- vi. Full dose of recommended phosphorus (Through DAP) and Potash (Through Muriate of Potash) are to be applied during land preparation.
- vii. Use 10-12 kg of seed/acre depending upon the variety i.e. 10 kg for fine and semi fine and 12 kg for coarse varieties.
- viii. Seeds are required to be soaked in water containing Bavistin and Streptocycline for 10-12 hours and are to be dried in shade before sowing (10 kg seeds be immersed in 10 litres of water containing 20 g Bavistin and 1 g Streptocycline).
- ix. Coarse and Semi fine rice types which usually are of short durations be sown from last week of May to first week of June and fine rice types (Basmati) which are often long in duration be sown between 2nd and 3rd week of June depending upon the area and the sowing of the succeeding crop to be taken in system with rice. Preference should be given to short duration varieties.
- x. Sowing should preferably be done in the evening hours at a depth of not more than 3 cm. This will help to improve germination.
- xi. Apply pendimethalin through Stomp @ 1333 ml in 200 litres of water/acre as pre emergence herbicide preferably on the same day after sowing. (Application of herbicide in the evening hours during summers improves weed control efficiency of the herbicide).
- xii. First irrigation is to be applied at least five days after sowing and this duration can be extended up to 21 DAS depending upon the weather, soil and condition of the crop.
- xiii. Apply first dose of 1/3rd nitrogen through urea 21 DAS.
- xiv. Apply bispyrebac-sodium through Nominee Gold @ 100 ml or bispyrebc-sodium through Nominee Gold @ 100 ml + ethoxysulfuron-ethyl through Sunrice @ 48 g in 200 liters of water/acre between 25-35 DAS.
- xv. Remaining 2/3rd of nitrogen is to be applied in two equal splits between 40-45 DAS and 60-65 DAS depending upon the variety.
- xvi. Need based irrigation is to be applied by following the process of alternate wetting and drying.

DIRECT DRY SEEDING OF RICE THROUGH DRUM SEEDER

Direct dry seeding of rice can also be done through drum seeder recommended for sowing rice under puddled conditions with minor modifications in the drum seeder as is clear in the picture. The additional attachments fitted in the drum seeder are four shares for opening the furrows and a planker to cover the seeds placed in the furrows. May be used by the farmers with small holdings amid labour scarcity.



Drum seeder



Direct Seeded rice sown with drum seeder in farmer's field at R.S. Pura

PROCEDURE:

- i. Adopt Stale seed bed technique in the fields which are usually infested with weeds, especially weedy rice. It is done by irrigating the field after harvesting the *Rabi* crop and then ploughed to allow the weeds to germinate. Plough the germinated weeds in the field and allow this situation as such for few days. Repeat this process at least twice before pre sowing irrigation.
- ii. Plan pre sowing irrigation keeping in view the soil type and current climatic conditions as the field should preferably contain sufficient moisture at the time of sowing.
- iii. Except light soils, this practice is recommended for all types of soils. Light soils devoid of required water availability often suffer from deficiency of iron (Chlorosis of youngest leaf in the seedlings which usually appears between 4-6 weeks after germination). However, it can be taken care of either by giving copious irrigations as soon as it appears coupled with spray of 0.5 per cent ferrous sulphate solution at weekly intervals (1 kg of ferrous sulphate solution in 200 liters of water/acre).
- iv. Requires well pulverized and leveled field (Preferably laser leveled) for efficient results.
- v. Full dose of recommended phosphorus (Through DAP) and Potash (Through Muriate of Potash) are to be applied during land preparation.
- vi. Use 10-12 kg of seed/acre depending upon the variety i.e. 10 kg for fine and semi fine and 12 kg for coarse varieties.
- vii. Seeds are required to be soaked in water containing Bavistin and Streptocycline for 10-12 hours and are to be dried in shade before sowing (10 kg seeds be immersed in 10 litres of water containing 20 g Bavistin and 1 g Streptocycline).
- viii. Coarse and Semi fine rice types which usually are of short durations be sown from last week of May to first week of June and fine rice types (Basmati) which are often long in duration be sown between 2nd and 3rd week of June depending upon the area and the sowing of the succeeding crop to be taken in system with rice. Preference should be given to short duration varieties.
- ix. Sowing should preferably be done in the evening hours at a depth of not more than 3 cm. This will help to improve germination.
- x. The treated seeds are put in the seed drums and the drum seeder is pulled manually. The shares attached with the drum will help in opening the furrows and the seeds dropped in the furrows shall be covered with the planker.
- xi. Apply pendimethalin through Stomp @ 1333 ml in 200 litres of water/acre as pre emergence herbicide preferably on the same day after sowing. (Application of herbicide in the evening hours during summers improves weed control efficiency of the herbicide).
- xii. First irrigation is to be applied at least five days after sowing and this duration can be extended up to 21 DAS depending upon the weather, soil and condition of the crop.
- xiii. Apply first dose of 1/3rd nitrogen through urea 21 DAS.

- xiv. Apply bispyrebac-sodium through Nominee Gold @ 100 ml or bispyrebc-sodium through Nominee Gold @ 100 ml + ethoxysulfuron-ethyl through Sunrice @ 48 g in 200 liters of water/acre between 25-35 DAS.
- xv. Remaining 2/3rd of nitrogen is to be applied in two equal splits between 40-45 DAS and 60-65 DAS depending upon the variety.
- xvi. Need based irrigation is to be applied by following the process of alternate wetting and drying.

DIRECT SEEDING OF RICE THROUGH ZERO TILL SEED DRILL / SEED CUM FERTILIZER DRILL

Zero Seed Drill and Seed cum Fertilizer Drill recommended for sowing of wheat can also be used for direct seeding of rice after proper calibration under the guidance of technical persons and with certain modified procedures of sowing.



Rice crop sown with Zero Seed Drill

PROCEDURE:

- i. Adopt Stale seed bed technique in the fields which are usually infested with weeds, especially weedy rice (Choba). It is done by irrigating the field after harvesting the *Rabi* crop and then ploughed to allow the weeds to germinate. Plough the germinated weeds in the field and allow this situation as such for few days. Repeat this process at least twice before pre sowing irrigation.
- ii. Plan pre sowing irrigation keeping in view the soil type and current weather conditions as the field should preferably contain sufficient moisture at the time of sowing.
- iii. Except light soils, this practice is recommended for all types of soils. Light soils devoid of required water availability often suffer from deficiency of iron (Chlorosis of youngest leaf in the seedlings which usually appears between 4-6 weeks after germination). However, it can be taken care of either by giving copious irrigations as soon as it appears

- coupled with spray of 0.5 per cent ferrous sulphate solution at weekly intervals (1 kg of ferrous sulphate solution in 200 liters of water/acre).
- iv. Prepare the fields to requisite tilth. A well pulverized and leveled field is needed for efficient results (Preferably laser leveled).
 - v. Full dose of recommended phosphorus (Through DAP) and Potash (Through Muriate of Potash) of the rice variety to be sown is applied during land preparation.
 - vi. Use 12-14 kg of seed/acre depending upon the variety i.e. 12 kg for fine and semi fine and 14 kg for coarse varieties.
 - vii. Seeds are required to be soaked in water containing Bavistin and Streptocycline for 10-12 hours and are to be dried in shade before sowing (10 kg seeds be immersed in 10 litres of water containing 20 g Bavistin and 1 g Streptocycline).
 - viii. Coarse and Semi fine rice types which usually are of short duration be sown from last week of May to first week of June and fine rice types (Basmati) which are often long in duration be sown between 2nd and 3rd week of June depending upon the area and the sowing of the succeeding crop to be taken in system with rice. Preference should be given to short duration varieties.
 - ix. Sowing should preferably be done in the evening hours at a depth of not more than 3 cm. This will help to improve germination.
 - x. The seed to be used is mixed either with FYM or Vermicompost coated recommended quantity of DAP of the rice variety to be sown to raise the bulk of seed to 100 kg and this bulk will suffice for sowing an area of one hectare. For example, if a farmer intends to cultivate Basmati-370, he has to take 30 kg seed, 45 kg DAP and 25 kg either of FYM or Vermicompost. The quantity of DAP and FYM or Vermicompost to be used for coating of DAP fertilizer shall vary from variety to variety. For coating of DAP take required quantity of FYM or Vermicompost, moisten it and then mix gently by hands with DAP so that a covering is formed on the surface of the DAP granules. This coated DAP then shall be thoroughly mixed with seed which is already treated and be used for sowing either with Zero Till Seed Drill or Seed cum Fertilizer Drill in the well prepared and leveled fields having sufficient moisture. Keep continuous vigil on the seed both in the seed drum by keeping it mixing continuously, as well as on the seed carrying pipes to prevent their choking. A plunger shall also be attached with the machine to cover the seeds. Coating of FYM shall not only help in avoiding the direct contact of fertilizer DAP with rice seeds but will also increase the seed mixed bulk to the required quantity needed for uniform distribution/sowing of rice seeds with these machines.
 - xi. Apply pendimethalin through Stomp @ 1333 ml in 200 litres of water/acre as pre emergence herbicide preferably on the same day after sowing. (Application of herbicide in the evening hours during summers improves weed control efficiency of the herbicide).
 - xii. First irrigation is to be applied at least five days after sowing and this duration can be extended up to 21 DAS depending upon the weather, soil and condition of the crop.
 - xiii. Apply first dose of 1/3rd nitrogen through urea 21 DAS.

- xiv. Apply bispyrebac-sodium through Nominee Gold @100 ml or bispyrebc-sodium through Nominee Gold @ 100 ml + ethoxysulfuron-ethyl through Sunrice @ 48 g in 200 liters of water/acre between 25-35 DAS.
- xv. Remaining 2/3rd of nitrogen is to be applied in two equal splits between 40-45 DAS and 60-65 DAS depending upon the variety.
- xvi. Need based irrigation is to be applied by following the process of alternate wetting and drying.

DIRECT SEEDING OF RICE BY KERA METHOD

The *Kera* method of sowing is a practice quite famous in sowing of wheat. But under emergent situations devoid of all the other probable alternatives and being comparatively less labour intensive to TPR, this technique can also be practiced in direct seeding of rice in furrows, provided all the other production recommendations of DSR specifically seed treatment and management of micronutrient deficiencies especially iron and weeds are strictly adhered to.

PROCEDURE:

- i. Adopt Stale seed bed technique in the fields which are usually infested with weeds, especially weedy rice (Choba). It is done by irrigating the field after harvesting the *Rabi* crop and then ploughed to allow the weeds to germinate. Plough the germinated weeds in the field and allow this situation as such for few days. Repeat this process at least twice before pre sowing irrigation.
- ii. Plan pre sowing irrigation keeping in view the soil type and current weather conditions as the field should preferably contain sufficient moisture at the time of sowing.
- iii. Except light soils, this practice is recommended for all types of soils. Light soils devoid of required water availability often suffer from deficiency of iron (Chlorosis of youngest leaf in the seedlings which usually appears between 4-6 weeks after germination). However, it can be taken care of either by giving copious irrigations as soon as it appears coupled with spray of 0.5 per cent ferrous sulphate solution at weekly intervals (1 kg of ferrous sulphate solution in 200 liters of water/acre).
- iv. Prepare the fields to requisite tilth. A well pulverized and leveled field is needed for efficient results.
- v. Full dose of recommended phosphorus (Through DAP) and Potash (Through Muriate of Potash) of the rice variety to be sown is applied during land preparation.
- vi. Use 12-14 kg of seed/acre depending upon the variety i.e. 12 kg for fine and semi fine and 14 kg for coarse varieties.
- vii. Seeds are required to be soaked in water containing Bavistin and Streptocycline for 10-12 hours and are to be dried in shade before sowing (10 kg seeds be immersed in 10 litres of water containing 20 g Bavistin and 1 g Streptocycline).

- viii. Coarse and Semi fine rice types which usually are of short duration be sown from last week of May to first week of June and fine rice types (Basmati) which are often long in duration be sown between 2nd and 3rd week of June depending upon the area and the sowing of the succeeding crop to be taken in system with rice. Preference should be given to short duration varieties.
- ix. Sowing should preferably be done in the evening hours at a depth of not more than 3 cm. This will help to improve germination.
- x. Open furrows in the prepared well leveled field using tractor drawn or bullock drawn plough at a spacing of 20 cm in one direction only. The bulk of seed to be used for sowing under this method shall be increased by mixing the recommended quantity of treated seeds either with FYM or Vermicompost only to raise the bulk size to 100 kg. For example in case of Basmati-370, 30 kg of seed be thoroughly mixed with 70 kg of either FYM or Vermicompost. The seeds are sown in the furrows by Kera method. After sowing, the seeds in the furrows are to be covered by planking preferably with bullock drawn planker.
- xi. Apply pendimethalin through Stomp @ 1333 ml in 200 litres of water/acre as pre emergence herbicide preferably on the same day after sowing. (Application of herbicide in the evening hours during summers improves weed control efficiency of the herbicide).
- xii. First irrigation is to be applied at least five days after sowing and this duration can be extended up to 21 DAS depending upon the weather, soil and condition of the crop.
- xiii. Apply first dose of 1/3rd nitrogen through urea 21 DAS.
- xiv. Apply bispyrebac-sodium through Nominee Gold @ 100 ml or bispyrebc-sodium through Nominee Gold @ 100 ml + Ethoxysulfuron-ethyl through Sunrice @ 48 g in 200 liters of water/acre between 25-35 DAS.
- xv. Remaining 2/3rd of nitrogen is to be applied in two equal splits between 40-45 DAS and 60-65 DAS depending upon the variety.
- xvi. Need based irrigation is to be applied by following the process of alternate wetting and drying at appearance of hair line size cracks

DIRECT SEEDING OF RICE BY BROADCASTING IN OPENED FURROWS

This technique is a little modification of the broadcasting method of sowing. In this method the broadcasting of the seed is done in the fields with furrows opened in one direction and the planking is to be done in the direction perpendicular to the direction of the furrows in the field. This will help not only in proper coverage of the seed but shall also enable the seeds which are dropped on the ridges to get in to the furrows. May be put in to practice amid labour scarcity situations only, that too, if all the other recommendations of DSR are strictly adhered to.

PROCEDURE:

- i. Adopt Stale seed bed technique in the fields which are usually infested with weeds, especially weedy rice (Choba). It is done by irrigating the field after harvesting the *Rabi* crop and then ploughed to allow the weeds to germinate. Plough the germinated weeds in the field and allow this situation as such for few days. Repeat this process at least twice before pre sowing irrigation.
- ii. Plan pre sowing irrigation keeping in view the soil type and current weather conditions as the field should preferably contain sufficient moisture at the time of sowing.
- iii. Except light soils, this practice is recommended for all types of soils. Light soils devoid of required water availability often suffer from deficiency of iron (Chlorosis of youngest leaf in the seedlings which usually appears between 4-6 weeks after germination). However, it can be taken care of either by giving copious irrigations as soon as it appears coupled with spray of 0.5 per cent ferrous sulphate solution at weekly intervals (1 kg of ferrous sulphate solution in 200 liters of water/acre).
- iv. Prepare the fields to requisite tilth. A well pulverized and leveled field is needed for efficient results.
- v. Full dose of recommended phosphorus (Through DAP) and Potash (Through Muriate of Potash) of the rice variety to be sown is applied during land preparation.
- vi. Use 12-14 kg of seed/acre depending upon the variety i.e. 12 kg for fine and semi fine and 14 kg for coarse varieties.
- vii. Seeds are required to be soaked in water containing Bavistin and Streptocycline for 10-12 hours and are to be dried in shade before sowing (10 kg seeds be immersed in 10 litres of water containing 20 g Bavistin and 1 g Streptocycline).
- viii. Coarse and Semi fine rice types which usually are of short duration be sown from last week of May to first week of June and fine rice types (Basmati) which are often long in duration be sown between 2nd and 3rd week of June depending upon the area and the sowing of the succeeding crop to be taken in system with rice. Preference should be given to short duration varieties.
- ix. Sowing should preferably be done in the evening hours at a depth of not more than 3 cm. This will help to improve germination.
- x. Open furrows in the prepared well leveled field using tractor drawn or bullock drawn plough at a spacing of 20 cm in one direction only. The bulk of seed to be used for sowing under this method shall be increased by mixing the recommended quantity of treated seeds either with FYM or Vermicompost only to raise the bulk size to 100 kg. For example in case of Basmati-370, 30 kg of seed be thoroughly mixed with 70 kg of either FYM or Vermicompost. The seeds are broadcasted in the fields with furrows opened in one direction and the planking is done in the direction perpendicular to the direction of the furrows in the field. After sowing, the seeds in the furrows are to be covered by planking preferably with bullock drawn planker.

- xi. Apply pendimethalin through Stomp @ 1333 ml in 200 litres of water/acre as pre emergence herbicide preferably on the same day after sowing. (Application of herbicide in the evening hours during summers improves weed control efficiency of the herbicide).
- xii. First irrigation is to be applied at least five days after sowing and this duration can be extended up to 21 DAS depending upon the weather, soil and condition of the crop.
- xiii. Apply first dose of 1/3rd nitrogen through urea 21 DAS.
- xiv. Apply bispyrebac-sodium through Nominee Gold @ 100 ml or bispyrebc-sodium through Nominee Gold @ 100 ml + Ethoxysulfuron-ethyl through Sunrice @ 48 g in 200 liters of water/acre between 25-35 DAS.
- xv. Remaining 2/3rd of nitrogen is to be applied in two equal splits between 40-45 DAS and 60-65 DAS depending upon the variety.
- xvi. Need based irrigation is to be applied by following the process of alternate wetting and drying.



Compiled and Edited by

Dr. B.C. Sharma, Prof & Head, Agronomy

Dr. R. Puniya, Jr. Scientist, Agronomy

Dr. Pawan Sharma, SMS, KVK Kathua