बिहार सरकार
गन्ना उद्योग विभाग

पत्रांक–01/विकास–16363/2025– 60 स्वी0/cc पटना, दिनांक– 06 मई, 2026

प्रेषक,

अनिल कुमार झा, भा0प्र0से0
ईखायुक्त, बिहार, पटना।

सेवा में,

महालेखाकार,
बिहार, पटना।

द्वारा– **आंतरिक वित्तीय सलाहकार।**

विषय : **राज्य योजना अंतर्गत "Development of Climate Resilient Production Technology for Escaping Submergence in Sugarcane under Flood-Prone/Waterlogged Areas in Bihar" के कार्यान्वयन हेतु तीन वर्षो (2026–27 से 2028–29 तक) के लिए कुल 105.88 लाख रू0 की योजना क्रियान्वयन की स्वीकृति तथा इसके अन्तर्गत वित्तीय वर्ष 2026–27 (प्रथम वर्ष) के लिए राज्य योजना के तहत कुल 38.28 लाख रू0 (अड़तीस लाख अठाईस हजार रूपये मात्र) के व्यय की स्वीकृति।**

आदेशः **स्वीकृत।**

महाशय,

उपर्युक्त विषयक राज्य में जलभराव एवं बाढ़ प्रभावित क्षेत्रों में गन्ना उत्पादन पर प्रभाव का अध्ययन एवं समाधान विकसित करना, जलवायु अनुकूल एवं सहनशील गन्ना प्रजातियों का चयन एवं प्रसार, उत्पादन एवं उत्पादकता में वृद्धि हेतु उन्नत तकनीकों का विकास एवं मानकीकरण, बाढ़/जलजमाव की स्थिति में फसल क्षति को न्यूनतम करने के उद्देश्य से ईख अनुसंधान संस्थान, पूसा (समस्तीपुर) द्वारा समर्पित परियोजना प्रस्ताव के आलोक में राज्य योजना अंतर्गत "Development of Climate Resilient Production Technology for Escaping Submergence in Sugarcane under Flood-Prone/Waterlogged Areas in Bihar" के कार्यान्वयन हेतु तीन वर्षो (2026–27 से 2028–29 तक) के लिए कुल 105.88 लाख रू0 की योजना क्रियान्वयन की स्वीकृति तथा इसके अन्तर्गत वित्तीय वर्ष 2026–27 (प्रथम वर्ष) के लिए राज्य योजना के तहत कुल 38.28 लाख रू0 (अड़तीस लाख अठाईस हजार रूपये मात्र) की निकासी एवं व्यय की स्वीकृति दी जाती है।

2. इस योजना का क्रियान्वयन ईख अनुसंधान संस्थान, पूसा (समस्तीपुर) द्वारा किया जाएगा। योजनांतर्गत वर्षवार निम्नलिखित कार्य यथा– प्रथम वर्ष :–Exploratory & Preparatory Phase, द्वितीय वर्षः Technology Development Phase एवं तृतीय वर्षः Validation & Refinement Phase का कार्यान्वयन किया जायेगा।

3. इस योजना का कार्यान्वयन ईख अनुसंधान संस्थान, पूसा, समस्तीपुर के द्वारा परियोजना प्रस्ताव के अनुरूप किया जायेगा। स्वीकृत परियोजना प्रस्ताव की प्रति संलग्न है।

Centre of Excellence 2025-26 (sanction)-4

4. योजना अंतर्गत स्वीकृत राशि की निकासी विशेष कार्य पदाधिकारी–सह–निकासी एवं व्ययन पदाधिकारी, गन्ना उद्योग विभाग द्वारा सचिवालय कोषागार, विकास भवन, पटना से की जायेगी तथा तथा ईख अनुसंधान संस्थान, पूसा (समस्तीपुर)/डॉ० राजेन्द्र प्रसाद केन्द्रीय विश्वविद्यालय, पूसा, समस्तीपुर को उनके द्वारा समर्पित पूर्व प्राप्ति रसीद के आलोक में Comptroller, Dr. RPCAU, Pusa को उनके बैंक Punjab National Bank, शाखा– RAU, Pusa, Samastipur, Bihar, खाता संख्या– **4512002100000922**, IFSC Code No.–**PUNB0451200** में CFMS के माध्यम से सीधे अन्तरण द्वारा भुगतान सुनिश्चित किया जायेगा।

5. इस योजनांतर्गत प्रथम वर्ष के लिए स्वीकृत कुल 38.28 लाख रू0 (अड़तीस लाख अठाईस हजार रूपये मात्र) रूपये वित्तीय वर्ष 2026–27 में राज्य योजनान्तर्गत बजट प्रावधान के तहत निम्न शीर्ष से विकलनीय होगा–

क्रम संख्या	बजट शीर्ष	विषय शीर्ष	निकासी हेतु स्वीकृत राशि/ विकलनीय राशि (लाख रू0)
1.	<u>सामान्य वर्ग–</u> मुख्य शीर्ष 2401–फसल कृषि कर्म–उप मुख्य शीर्ष–00–लघु शीर्ष–108 वाणिज्यिक फसलें मांग संख्या–45 उप शीर्ष–0109 ईख विकास विपत्र कोड– 45–2401001080109	33 01 सब्सिडी	38.28
	योग–		**38.28**

6. आगामी वर्ष के लिए राशि के विमुक्ति हेतु ईख अनुसंधान संस्थान, पूसा, समस्तीपुर द्वारा योजना कार्य का प्रगति प्रतिवेदन एवं व्यय की गयी राशि का विस्तृत विवरण के साथ समय–समय पर उपयोगिता प्रमाण पत्र एवं फलाफल प्रतिवेदन विभाग को अनिवार्य रूप से समर्पित किया जायेगा। योजना कार्यान्वयन में वित्तीय नियमावली का अनुपालन सुनिश्चित कराने का पूर्ण दायित्व निदेशक, ईख अनुसंधान संस्थान, पूसा, समस्तीपुर की होगी।

7. ईखायुक्त, बिहार योजना के सर्वोच्च नियंत्री पदाधिकारी होंगे। क्षेत्रीय स्तर पर उप निदेशक, ईख विकास, पूसा एवं संबंधित सहायक निदेशक, ईख विकास के द्वारा समय–समय पर योजनाओं का अनुश्रवण एवं पर्यवेक्षण किया जायेगा।

8. वित्त विभाग के पत्रांक–2561 (वि0)2 दिनांक–17.04.1998 का अनुपालन निकासी एवं व्ययन पदाधिकारी द्वारा सुनिश्चित किया जायेगा।

9. योजना प्रस्ताव पर विभागीय स्थायी वित्त समिति की दिनांक–24.04.2026 को आयोजित बैठक में स्वीकृति प्राप्त है।

10. राज्यादेश प्रारूप एवं प्रस्ताव पर वित्त विभागीय संकल्प संख्या–12888/वि० दिनांक–03.12.2024 की कंडिका–2 (क) के आलोक में अपर मुख्य सचिव, गन्ना उद्योग विभाग, बिहार, पटना का अनुमोदन संचिका सं0–01/विकास–16363/2025 के पृष्ठ सं0–05/टि0 पर दिनांक–05.05.2026 को प्राप्त है।

11. राज्यादेश प्रारूप में आंतरिक वित्तीय सलाहकार की सहमति संचिका सं0–01/विकास–16360/2025 के पृष्ठ सं0–05/टि0 पर दिनांक–05.05.2026 को प्राप्त है।

12. वित्त विभाग के पत्रांक 7355 दिनांक 05.10.2007 के आलोक में महालेखाकार से प्राधिकार पत्र की आवश्यकता नहीं है।

अनुलग्नक–यथोक्त:

विश्वासभाजन

ईखायुक्त, बिहार।

ज्ञाप संख्या–01/विकास–16363/2025– 60 स्वी0/cc पटना, दिनांक– 06 मई, 2026

प्रतिलिपि– कोषागार पदाधिकारी, सचिवालय कोषागार, विकास भवन, पटना/वित्त विभाग (बजट शाखा), बिहार, पटना/कुलपति, डा0 राजेन्द्र प्रसाद केन्द्रीय कृषि विश्वविघालय, पूसा (समस्तीपुर)/निदेशक, ईख अनुसंधान संस्थान, पूसा, समस्तीपुर को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

ईखायुक्त, बिहार।

ज्ञाप संख्या–01/विकास–16363/2025– 60 स्वी0/cc पटना, दिनांक– 06 मई, 2026

प्रतिलिपि– विशेष कार्य पदाधिकारी–सह–निकासी एवं व्ययन पदाधिकारी, गन्ना उद्योग विभाग, बिहार, पटना/सभी सहायक निदेशक, ईख विकास तथा महाप्रबंधक/कार्यपालक अध्यक्ष, राज्य की सभी कार्यरत चीनी मिल/सचिव, बिस्मा/सभी विशेष ईख पदाधिकारी एवं ईख पदाधिकारी/बजट शाखा/लेखा शाखा, गन्ना उद्योग विभाग, बिहार, पटना को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

2. आई0 टी0 प्रबंधक, गन्ना उद्योग विभाग को विभागीय वेबसाईट पर अपलोड करने हेतु प्रेषित।

ईखायुक्त, बिहार।

ज्ञाप संख्या–01/विकास–16363/2025– 60 स्वी0/cc पटना, दिनांक– 06 मई, 2026

प्रतिलिपि– माननीय मंत्री, गन्ना उद्योग विभाग, बिहार, पटना के प्रधान आप्त सचिव/अपर मुख्य सचिव, गन्ना उद्योग विभाग, बिहार, पटना के प्रधान आप्त सचिव/ईखायुक्त, बिहार के निजी सहायक को सूचनार्थ प्रेषित।

ईखायुक्त, बिहार।

Dr. Rajendra Prasad Central Agricultural University, Pusa (Samastipur) 848 125

FORMAT FOR SUBMISSION OF PROJECT PROPOSAL TO SUGARCANE INDUSTRIES DEPARTMENT GOVERNMENT OF BIHAR

PART- A

1.	Title of the project	:	Development of Climate Resilient Production Technology for Escaping Submergence in Sugarcane under Flood-Prone/ Waterlogged Areas of Bihar
2.	Name and designation of Principal Investigator with e-mail and mobile no.	:	Dr. Navnit Kumar, Sr. Scientist-cum-Associate Professor Email: navnit.sri@rpcau.ac.in Mobile no. 8825340316
3.	Address: Office of PI	:	Department of Agronomy, Sugarcane Research Institute, RPCAU, Pusa (Bihar)
4.	Name and designation of Co-Investigator with e-mail and mobile no. (if any)	:	Dr. Lalita Rana, Assistant Professor (Agronomy), SRI, Pusa Dr. C.K. Jha, Associate Professor (Soil Science), SRI, Pusa Dr. Anil Kumar (Entomology), SRI, Pusa Dr. S.N. Singh (Plant Pathology), SRI, Pusa Dr. D.N. Kamat, Associate Professor (Plant Breeding), SRI, Pusa
5.	Address: Office of Co-PI	:	Department of Agronomy, Sugarcane Research Institute, RPCAU, Pusa (Bihar)
6.	Name of the Department/ college/ Institution where the project will be undertaken	:	Agronomy, Sugarcane Research Institute, RPCAU, Pusa (Bihar)
7.	Teaching and Research Experience of PI (in years)	:	18
8.	Research papers published by PI during last 5 years (pl. attach a list)	:	30
9.	Teaching and Research Experience of Co-PI (in years)	:	
10.	Research papers published by Co-PI during last 5 years (pl. attach a list)	:	
11.	On-going research project with PI	:	AICRP on Sugarcane & other projects
12.	On-going research project with Co-PI	:	

PART- B

Proposed Research Work

Project Title	:	Response of sugarcane to depth and duration of waterlogging
Duration of the project	:	One cycle of 3 years
Genesis	:	Among the abiotic stresses responsible for low productivity, waterlogging are undoubtly one of them, which deteriorate yield and quality to a greater extent. Lack of knowledge of

		management practices/ suitable agro techniques under waterlogged condition among the cane growers is another key factor for low yield and poor recovery. As we know that, sugarcane is one of the most important commercial crops of Bihar, contributing significantly to the livelihood of farmers and the sugar industry. However, the productivity of sugarcane in the state remains much lower than the national average. Among the various constraints, waterlogging and flooding are the most severe problems affecting sugarcane growth and yield. Approximately 30–35% of the sugarcane-growing area in Bihar falls under waterlogged conditions. Although varieties such as COP-9301 exhibit partial tolerance to waterlogging, they fail to perform under conditions of complete submergence. In flood-prone districts like West Champaran and East Champaran, prolonged submergence of 30–40% of the cane area often leads to severe yield losses, sometimes reaching up to 100%. This situation threatens the livelihood of thousands of farmers and the sustainability of the state's sugar industries.
Rationale Summary of the proposed research (up to 150 words) indicating overall aims of research and importance of the research proposal.	:	Sugarcane is an important commercial crop of India but its productivity is low in India as compared to many other sugarcane growing countries of the world. In Bihar about 25-35 per cent of sugarcane areas falls under waterlogged condition. Growing of sugarcane varieties having less or no waterlogging tolerance is one of the major factors for low yield in Bihar. Losses due to waterlogging depend upon depth and duration of waterlogging, flow of water, aerial roots, stage of crop, soil condition and variety etc. Juice quality of cane was badly affected by submergence but magnitude of variation under partial submergence was quite low. There is an urgent need to develop a production technology that enables sugarcane to escape the adverse impact of complete submergence. Ensuring adequate plant height before the occurrence of floods is one of the most promising strategies to minimize yield losses. The proposed investigation is designed to develop and standardize a suitable

		production technology for flood-prone areas of Bihar. This technology will help farmers safeguard their crops, reduce risks of complete crop failure, and improve productivity and profitability in sugarcane cultivation. Hence, the present investigation was taken up to study the effect of depth and duration of waterlogging on yield and quality of sugarcane under north Bihar condition.
Preliminary/ earlier work already done by the PI/ Co-PI on this problem (if any)	:	1. Growth, yield and quality assessment of sugarcane varieties under waterlogged condition 2. Comparative analysis of yield and quality in sugarcane genotypes under waterlogged and normal condition 3. Effect of planting method on yield and quality of sugarcane varieties under waterlogged condition 4. Effect of planting material and varieties on yield and quality of sugarcane under waterlogged condition
A brief resume of work done in India and abroad related with project work	:	Kumar *et al.* (2015) reported that higher water stagnation during grand phase (July-September) reduced plant height by 9.4%, cane diameter by 13.4%%, millable canes by 13.8%, single cane weight by 15.7% over normal condition. Gilbert *et al.* (2007) noticed 38% reduction in leaf weight, 4-15 times greater adventitious root development, 108% greater aerenchyma extension due to a continuous 3 months flood. Hasan *et al.* (2003) showed lowest tiller, millable canes and cane yield under waterlogged condition. If waterlogging occurs during July to September which is the grand growth period of crop, adverse effect is reported on growth, yield and quality of sugarcane (Kumar, 2009; Kumar *et al.* 2013; Kumar 2018). Plants develop a suite of anatomical, morphological and physiological responses in order to deal with partial submergence imposed by flooding (Colmer and Voesenek, 2009; Striker *et al.*, 2005). The most common anatomical response is the generation of aerenchyma in tissues (Seago *et al.*, 2005), which facilitates the transport of oxygen from shoots to roots (Colmer, 2003).
Objectives	:	1. To assess the impact of different agronomic practices on early growth and plant height of sugarcane prior to flood occurrence.

		2. To evaluate the performance of selected sugarcane varieties under waterlogged and submergence conditions. 3. To develop and standardize a production technology for flood-prone regions of Bihar.
Methodology and year-wise plan of work	:	**Trial –I (Response of sugarcane to depth and duration of waterlogging)** 1. *Depth of waterlogging* D_1 : 30 cm D_2 : 45 cm D_3 : 60 cm D_4 : 75 cm 2. *Duration of waterlogging (days)* T_1 : 30 (July) T_2 : 60 (July - August) T_3 : 90 (July – August- Sept.) Design: Strip plot Replication: 3 Gross plot size: 10 × 5.4 m Spacing : 120 cm Planting season : Autumn **Trial –II (Development of suitable management practices for improving autumn sugarcane productivity under waterlogged condition)** **Irrigation schedule**: I_1: 10 days interval I_2: 20 days interval I_3: 30 days interval **Fertilizer management** 1. M_1 : 100% NPK + ZnB at planting + Spray of KNO_3 @ 2% at 15 days interval during flooding + spray of 2% urea at grand growth stage 2. M_2 : 125% NPK + ZnB + Spray of KNO_3 @ 2% at 15 days interval during flooding + Spray of 2% urea at grand growth stage 3. M_3 : 150% NPK + ZnB + Spray of KNO_3 @ 2% at 15 days interval during flooding + Spray of 2% urea at grand growth stage 4. M_4 :Farmers practice Design : Random Block design Row spacing: 120 cm Planting material: Single node settlings Source of fertilizer: N- Sulphur/ Neem coated

		urea; P- DAP; K- K_2SO_4; Zn- $ZnSO_4$; B- Borax. Foliar spray: KNO_3 **Note**: Light irrigation at the time of transplanting will be applied for establishment of settlings **Trial –III (Development of suitable management practices for improving spring sugarcane productivity under waterlogged condition)** **Irrigation schedule**: I_1: 10 days interval I_2: 20 days interval I_3: 30 days interval **Fertilizer management** 1. M_1 : 100% NPK + ZnB at planting + Spray of KNO_3 @ 2% at 15 days interval during flooding + spray of 2% urea at grand growth stage 2. M_2 : 125% NPK + ZnB + Spray of KNO_3 @ 2% at 15 days interval during flooding + Spray of 2% urea at grand growth stage 3. M_3 : 150% NPK + ZnB + Spray of KNO_3 @ 2% at 15 days interval during flooding + Spray of 2% urea at grand growth stage 4. M_4 :Farmers practice Design : Random Block design Row spacing: 120 cm Planting material: Single node settlings Source of fertilizer: N- Sulphur/ Neem coated urea; P- DAP; K- K_2SO_4; Zn- $ZnSO_4$; B- Borax. Foliar spray: KNO_3 Design : Random Block design Row spacing: 120 cm **Note:** Light irrigation at the time of transplanting will be applied for establishment of settlings **Trial –IV (Screening of suitable varieties for improving sugarcane productivity under waterlogged condition):** Breeder of institute will evaluate the suitability of sugarcane varieties for water logged conditions

Targets to be achieved each year	:	**Work Plan & Timeline** **Year 1 (2025–26): Exploratory & Preparatory Phase** • Survey of waterlogging/ flood-prone sugarcane areas to assess damage levels. • Collection of baseline data on existing farmer practices. • Selection of experimental sites and initial field trials. • Screening of sugarcane varieties under controlled waterlogging/submergence conditions. • Standardization of sowing time and early agronomic practices for rapid crop establishment. **Deliverables:** Baseline data, shortlisted varieties, preliminary observations. --- **Year 2 (2026–27): Technology Development Phase** • Detailed field experiments on selected varieties under simulated flood conditions. • Evaluation of agronomic practices • Monitoring of growth, physiological traits, and yield parameters. • Mid-term farmer participatory trials. **Deliverables:** Promising agronomic interventions, interim technical report. --- **Year 3 (2027–28): Validation & Refinement Phase** • Large-scale validation trials in farmers' fields in waterlogging/ flood-prone areas. • Refinement of the technology package based on field results and farmer feedback. • Economic analysis of the recommended practices. • Preparation of extension bulletins, manuals, and training modules. **Deliverables:** Final production technology package, extension materials, training programme/ field day.

		Optional Extension (Year 4–5, if approved): Scaling-Up Phase • Wide-scale demonstration trials across sugar mill command areas. • Collaboration with sugar industry and government programme for adoption. • Policy recommendations for waterlogging/ flood-resilient sugarcane production. **Deliverables:** State-level adoption framework, integration with crop advisory services.
Expected outcome/ recommendation/ technology in context of farmers benefit	:	• Development of a technology package to minimize sugarcane yield loss under flood/submergence conditions. • Identification of agronomic practices that promote rapid early growth and optimum plant height. • Recommendations for suitable varieties and management practices for flood-prone districts. • Increased productivity and profitability of sugarcane farming in Bihar. • Strengthened resilience of sugarcane cultivation to climate-induced flooding.
Collaboration with other Departments (if any)	:	Soil Science, Entomology, Plant Pathology and Statistics
Reference	:	Cited in Appendix- III

Tentative Budget Estimate (3 Years Project)
(All figures in INR Lakhs)

Budget Head	Year 1	Year 2	Year 3	Total
A. Salaries & Wages				
YP-1 (2)	6.00	6.60	7.26	19.86
Skilled Labour (1)	1.80	1.98	2.18	5.96
Unskilled Labour (2)	3.00	3.30	3.63	9.93
(Subtotal. A)	**10.80**	**11.88**	**13.07**	**35.75**
B. Equipment & Implements				
Waterlogging / flood simulation facility, pumps, tanks, sensors, Laptop/desktop etc.	8.00	2.00	1.00	11.00
Small farm machinery, sprayers, planting tools	2.00	0.50	0.50	3.00
(Subtotal. B)	**10.00**	**2.50**	**1.50**	**14.00**
C. Consumables & Experimental Costs				
Seed material, fertilizers, agrochemicals	2.50	3.00	3.50	9.00
Chemical	1.00	1.00	1.00	3.00
Glassware, lab consumables, stationary	0.50	0.50	0.50	1.50
(Subtotal. C)	**4.00**	**4.50**	**5.00**	**13.50**
D. Travel & Field Trials				
On-station & on-farm trials	2.00	2.50	3.00	7.50
Farmer participatory trials (inputs & logistics)	2.00	2.50	3.00	7.50
(Subtotal. D)	**4.00**	**5.00**	**6.00**	**15.00**
E. Training, Extension & Publications				
Farmer training programs & demonstrations	1.00	1.50	2.00	4.50
Publication/Display board/ Flexi etc.	1.50	0.50	1.00	3.00
POL/Hiring of vehicle	2.00	2.00	2.00	6.00
(Subtotal. E)	**4.50**	**4.00**	**5.00**	**13.50**
F. Contingency / TA/DA & Miscellaneous	**1.50**	**1.50**	**1.50**	**4.50**
Total (A+B+C+D+E+F)	**34.8**	**29.38**	**32.07**	**96.25**
Institutional Charge	**3.48**	**2.94**	**3.21**	**9.63**
Grand Total	**38.28**	**32.32**	**35.28**	**105.88**

Note: Emolument will be changed as university norms.

Summary

- Total Duration: 3 Years
- Estimated Cost: ~ ₹105.88 Lakhs

UNDERTAKING

a. General physical facilities, such as furniture/ space, etc are available in the Department/ College.
b. I/ We shall complete the proposed project programme with the stipulated period.
c. I/We agree to submit annual progress report and final report within one month from the date of termination of the project to Director (Research), RAU, Pusa.
d. The research work proposed in the project does not in any way duplicate the research work already done and being carried out elsewhere in India.

23.9.2025
(Navnit Kumar)
Associate Professor
(Agronomy), SRI, Pusa
Signature of Principal Investigator

Lalita 23 Sept 2025
(Lalita Rana)
Assistant Professor
(Agronomy), SRI, Pusa

23.9.2025
(C.K. Jha)
Associate Professor
(Soil Science), SRI, Pusa

(Anil Kumar)
Associate Professor
(Entomology), SRI, Pusa

23.09.2025
(S.N. Singh)
Associate Professor
(Plant Pathology), SRI, Pusa

23.9.2025
(D.N. Kamat)
Associate Professor
(Plant Breeding), SRI, Pusa

Signature of Co- Principal Investigator

Certified that:

1. All necessary facilities available in the Department will be provided if the research project is approved for financial assistance.
2. The statement of accounts will be submitted each year by P.I.
3. Certified that the equipment (s) as mentioned in the project is / are available in the Department.

23/09/2025
Signature of the Head/ Chairperson

Cane Comissioner
Bihar, Patna