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ECONOMIC IMPACTS OF PADDY PROCESSING UNITS ON THE RICE VALUE CHAIN IN THE SENEGAL RIVER DELTA

Manuscript Info …….

Abstract Manuscript History Received: xxxxxxxxxxxxxxx Final Accepted: xxxxxxxxxxx Published: xxxxxxxxxxxxxxx Key words:Processing, value chain, competitiveness This paper investigates the economic effects of paddy processing units on the rice value chain in the Senegal River Delta, using primary survey data and a binary logit model to identify determinants of local market participation. The empirical results indicate that processing capacity, the absence of marketing frictions, and a higher share of white rice production significantly increase the probability of local commercialization. In contrast, official and market price variables, as well as supply structure characteristics, are statistically insignificant. The findings emphasize the relevance of upgrading processing technologies, improving logistical efficiency, and enhancing the market value of locally produced white rice. 2 Policy interventions should prioritize equipment financing, capacity building, structured marketing channels, and quality promotion to strengthen the competitiveness of local rice.

Introduction : 1 In Senegal, rice is an essential staple food, with an annual per capita consumption of nearly 90 kg, 2 representing about 1.5 million tons (COSTEA Committee, 2020). It occupies a strategic position in 3 national agricultural policies and plays a major role in farmers' incomes and job creation in rural areas (within the 4 Senegal River Valley, the value chain supports between 200,000 and 300,000 households, representing nearly 1.5 5 million people (SAED, 2020)).Since 2010, national rice production has increased significantly due to the expansion 6 of cultivated areas and the implementation of public policies, along with the rapid development of processing units. 7 This dynamic, supported by private investments and international partners (USAID, KOICA, JICA, AFD, etc.), has 8 greatly contributed to improving the quality and competitiveness of locally produced rice. However, despite these 9 achievements, the value chain continues to face numerous challenges, including weak commercial organization, low 10 levels of mechanization, inconsistent paddy quality, limited storage capacity, and the obsolescence of part of the 11 industrial processing infrastructure (World

Bank, 2018; SAED, 2020). These constraints largely explain Senegal's 12 continued dependence on rice imports. 13 14 In this context, this article addresses the following question: What is the economic and social impact of the large15 scale establishment of paddy processing units on the competitiveness of the rice value chain in the Senegal 16 River Valley? 17 18 The objective is to analyze how these units influence stakeholders, their economic conditions, organizational 19 structures, and supply dynamics. The study uses descriptive statistics and multinomial regression to assess 20 perceptions of this impact. The results reveal unevenly distributed benefits: vertically integrated actors (production– 21 processing–marketing) appear to benefit more from these units, while persistent constraints remain regarding paddy 22 quality, access to finance, and the coexistence of official and market prices. This highlights the need for further 23 research to better understand these disparities and to more accurately assess the effectiveness of organizational 24 arrangements and contractual mechanisms. Such studies would help design more targeted public policies to 25 strengthen the socio-economic contribution of paddy processing and enhance the sustainable competitiveness of 26 Senegal's rice sector. 27

  Literature Review 28 The competitiveness of the rice sector in West Africa largely depends on the development of local processing units, 29 which are considered a key leverage point for creating added value, reducing post-harvest losses, and limiting 30 structural dependence on imports. The central role of processing units is confirmed by the pioneering work of Seck 31 et al. (2010), who demonstrate that African rice demand is growing faster than local production, making the 32 simultaneous improvement of productivity and processing capacity indispensable. 33 However, despite gains recorded since the 2010s, the competitiveness of Senegalese rice remains fragile. Seck et al. 34 (2013) highlight several major constraints, including heterogeneous paddy quality, high processing costs, 35 insufficient integration between producers, collectors, and processors,

and inadequately coordinated governance. 36 These authors emphasize the need for both institutional and technological reforms to ensure coherence between 37 agricultural, industrial, and commercial policies. 38 The importance of coordination among actors is further explored by Demont and Rizzotto (2012), who show that 39 contractual arrangements—such as cultivation contracts, forward purchase agreements, and price clauses— 40 constitute a key tool to ensure stable supply and improve the quality of processed rice. According to these authors, 41 the absence of formal contractual arrangements exacerbates price fluctuations and undermines industrial units that 42 depend on a reliable and regular supply. 43 From a qualitative perspective, several studies emphasize the importance of technical improvements in rice 44 processing. Cissé and Diagne (2018) demonstrate that the absence of grading, sorting, controlled drying, and 45 standardized packaging undermines the competitiveness of local rice vis-à-vis Asian imports. They also highlight 46 the fragmentation of marketing channels, which results in significant economic losses and hampers the development 47 of a structured market for local rice. 48 Soulé et al. (2020), on the other hand, focus on dysfunctions within the rice market. According to these authors, the 49 coexistence of official prices set by authorities and actual market prices creates distortions that disproportionately 50 affect small producers. They advocate for more effective regulation to enhance price transparency and reduce 51 information asymmetry among stakeholders. 52 Access to financing represents another critical determinant for the rice sector. Ndiaye (2017) describes the persistent 53 difficulties faced by stakeholders, including the lack of collateral, high interest rates, and the mismatch between 54 existing financial products and the seasonal needs of the sector. He recommends the establishment of tailored 55 agricultural financing mechanisms, including group seasonal loans, risk-sharing arrangements, and partnerships 56 between producers and processors. 57 These longstanding challenges are now being addressed through concrete recent initiatives. The RIZAO program, 58 launched in 2024 by AfricaRice and the Mastercard Foundation, exemplifies the current orientation of rice 59 development policies. This five-year program targets 441,000 jobs, 70% of which are dedicated to young

women, 60 and is structured around six strategic pillars: seed improvement, enhancement of processing, creation of rural 61 employment, modernization of legal frameworks, access to financing, and promotion of local rice (AfricaRice, 62 2024). The program underscores the strategic role of processing in strengthening the West African rice value chain. 63 In Senegal, recent investments follow the same strategic direction. Over 42 billion CFA francs have been mobilized 64 to improve local processing, reduce production costs, strengthen contractual arrangements between producers and 65 processors, standardize grading and packaging, and structure marketing channels (MAER, 2024). These measures 66 directly address the challenges identified by Cissé and Diagne (2018) and Soulé et al. (2020), seeking to rectify the 67 technical and commercial weaknesses of local rice. 68

ISSN: 2320-5407 Int. J. Adv. Res. X(X), XX-XX 3 These efforts also align with the approach advocated by Ndiaye (2017), introducing innovative financial 69 mechanisms tailored to the real needs of stakeholders, including seasonal loans, support for mechanization, and 70 vertically integrated partnerships. 71 Overall, both historical and recent literature converge on a clear conclusion: the development of paddy processing 72 units in the delta and the Senegal River Valley constitutes a strategic lever for enhancing the competitiveness 73 of local rice. This development promotes job creation—particularly for women—integrates activities along the 74 value chain, adds value to local rice, and contributes to national food sovereignty. 75 3. Methodology 76 3.1. Data Sources and Study Populations 77 This study is based on a quantitative survey conducted in the rice-growing area of the Delta. To carry out this 78 research, two main data collection tools were employed: a questionnaire and interview guides. The questionnaire 79 was administered to different categories of actors directly involved in the rice value chain, including owners of 80 artisanal dehusking units (UDAs), managers of rice mills, agricultural producers, and households residing in the 81 study area. Designed as a mixed-format instrument, combining closed- and open-ended questions, it enabled the 82 collection of both measurable quantitative data and

complementary qualitative information. 83 The interview guides, for their part, targeted key institutional and private actors, including rice mill managers, 84 suppliers of artisanal dehusking machines, representatives of artisanal dehusker owners'associations, as well as 85 various technical and financial support organizations such as the National Agricultural and Rural Advisory Agency 86 (ANCAR), the Delta and Senegal River Valley Development and Exploitation Company (SAED),USAID-Dooleel 87 Mbay (United States Agency for International Development – Dooleel Mbay Program), Crédit Mutuel du Sénégal 88 (CMS), the Agricultural Bank, the Interprofessional Union for Marketing and Entrepreneurship (UIMCEC), and 89 SYNGENTA. Local resource persons were also consulted to refine the understanding of ongoing dynamics. 90 The survey covered the main areas of concentration for artisanal dehusking units (UDAs) and rice mills in the Delta, 91 namely Richard Toll, Rosso, Ross Béthio, Diama, and Ronkh. To determine the sample size, Fisher's formula was 92 applied (Fisher, 1925; Cochran, 1977). From a total population of 118 UDAs, the sample size was calculated using 93 Fisher's formula: 94 95 where N=118 and d=0,07. The application of this formula yields: 96 97 Thus, 75 units were surveyed, corresponding to a 93% representativeness, consistent with a 7% margin of error. The 98 list of artisanal dehusking units to be surveyed in each area was randomly selected using the —RANDǁ function in 99 Excel. 100 Table 01: Survey situation of Number of dehusking machines 101 Municipalities Localities Number of dehusking machines To be surveyed per locality Weighting

 4 DIAMA NDELLE 1 1 8% DIAGAMBAL 2 1 NDIAYE 1 1 KASSACK NORD 2 1 KASSACK SUD 2 1 PONT GENDARME 1 1 ROSS BETHIO ROSS BETHIO 48 30 41% ROSSO ROSSO 26 16 22% RONK DIATENE 10 6 12% THIAGAR 5 3 RICHARD TOLL RICHARD TOLL 20 13 17% TOTAL 118 75 100% 102 3.2. Descriptive Statistics and Data Analysis 103 The majority of stakeholders perform multiple roles, reflecting a certain level of integration across activities. 104 Processors dominate with 97.6%, indicating that paddy

processing constitutes a central stage in the value chain. 105 They are followed by white rice traders (81.0%), 1 highlighting the importance of marketing within the sector. 106 Producers account for 66.7%, showing that some of them are not limited to production but also engage in other 107 segments of thevalue chain. Finally, service providers represent a minority (33.3%), likely specializing in logistical, 108 financial, or technical activities. 109 110 Table 0.2: Distribution of Stakeholders by Their Role in the Rice Value Chain 111 Producers 66,7% Processors 97,6% White Rice Traders 81,0% Service Providers 33,3% 112 In 2019, the average volume was 1,193 kg, with a maximum of 8,500 kg and 3 a high standard deviation (2,364), 113 indicating substantial variability among stakeholders, as shown in the table. In 2020, the average slightly decreased 114 to 1,068 kg (maximum 9,000 kg), while the standard deviation declined to 2,193, suggesting a modest 115 homogenization of supply. In 2021, the average remained stable at 1,068 kg, but the maximum increased to 10,500 116 kg, and the standard deviation rose again to 2,316, reflecting greater dispersion in volumes, with some actors 117 supplying significantly more than before. Overall, these data indicate stable mean volumes, accompanied by growth 118 at the extremes (increase in the maximum), signaling a polarization between small and large suppliers. 119 Table 0.3: Evolution of Average Supplied Paddy Quantities over Three Years (2019–2021)✅ 120 Years Mean Maximum Standard Deviation In 2019 1193 8500 2364 In 2020 1068 9000 2193 In 2021 1068 10500 2316 121

 Descriptive analysis shows a progression in cultivated areas over the period. In 2019, the mean cultivated area was 122 11.4 ha, with a median of 5 ha. The high standard deviation (20.1) reflects substantial heterogeneity, with some 123 producers cultivating up to 150 ha. In 2020, the mean increased to 12.8 ha, while variability remained significant 124 (standard deviation of 20.9). In 2021, the mean further rose to 16.2 ha. It is noteworthy that all producers cultivated 125 a minimum area of 0.4 ha. These results

indicate a slight trend toward expansion of cultivated areas. 126 Table 0.4: Evolution of Cultivated Areas (2019–2021)☑ 127 Mean Standard Deviation Maximum Evolution of Cultivated Areas in 2019 11,4 20,1 150,0 Evolution of Cultivated Areas in 2020 12,8 20,9 150,0 Evolution of Cultivated Areas in 2021 16,2 26,1 150,0 The analysis of cultivated areas indicates that the mode of financing influences the expansion of farmland. Producers 128 financed by banks or by processors show a steady increase in cultivated areas, with a gain of 5 ha for each group 129 over the 2019–2021 period. Those relying on own funds remain limited to 6–7 ha, suggesting that self-financing 130 constrains expansion. Paddy collectors maintain stable cultivated areas (22 ha), which may reflect already large 131 holdings or constraints independent of financing. 132 Table 0.5: Distribution of Cultivated Areas by Mode of Financing 133 Mode of Financing Evolution of Cultivated Areas in 2019 Evolution of Cultivated Areas in 2020 Evolution of Cultivated Areas in 2021 Mean Mean Mean Bank 11 12 16 Processors 17 18 22 Paddy Collectors 22 22 22 Own Funds 7 6 6 Producers selling to processors gradually increased their cultivated areas, from 12.4 ha in 2019 to 17.7 ha in 2021. In 134 contrast, those working with collectors experienced stagnation, with areas remaining around 6–8 ha. These results 135 indicate that relationships with processors promote the expansion of cultivated land, likely due to more stable 136 demand and secure supply conditions. 137 Table 0.6: Cultivated Areas by Type of Paddy Buyer 138 Evolution of Cultivated Areas in 2019 Evolution of Cultivated Areas in 2020 Evolution of Cultivated Areas in 2021 Mean Mean Mean To whom do you sell your paddy? /Processors 12,4 13,9 17,7 To whom do you sell your paddy? /Collectors 8,3 6,1 6,4 The analysis shows that the perceived economic impact of processing units is more pronounced among women’s 139 groups and family-run businesses. Indeed, 37.5% of women’s groups and 30% of family businesses consider that the 140 establishment of processing units has had a positive effect, compared to only 22.5% of individual enterprises and 141 10% of collective enterprises. Thus, structures organized around the family or women’s collectives benefit more 142 from the opportunities created by paddy processing, likely due to better coordination in supply, marketing, or 143

 activity diversification. In contrast, individual enterprises and some collective enterprises appear less responsive to 144 these effects, reflecting a more limited capacity to capitalize on the presence of processing units. 145 Table 0.7: Perceived Improvement in Living Conditions by Producer Categories and Organizational Type 146 Organizational Type Do you think that the large-scale establishment of paddy processing units in the Senegal River Valley (VFS) has had an economic impact on the value chain actors? If yes, please explain how. Non Oui Total Collective Enterprise 0,0% 10,0% 9,5% Family Business 0,0% 30,0% 28,6% Individual Enterprise 50,0% 22,5% 23,8% Women's Group 50,0% 37,5% 38,1% 147 The analysis of supply methods reveals that direct purchasing overwhelmingly dominates the value chain, with 148 95.2% of stakeholders using this approach. Sales contracts account for 38.1%, indicating limited reliance on formal 149 agreements, while production financing with in-kind repayment concerns only 11.9% of respondents. These figures 150 demonstrate that the majority of actors favor immediate and flexible transactions, whereas more formalized or 151 integrated mechanisms remain minority practices, which may constrain supply security and production planning. 152 Table 0.8: Organization and Paddy Supply Methods 153 Sales Contract 38,1% Direct Purchase 95,2% Production Financing with In-Kind Repayment 11,9% 154 3.3. Econometric Model Specification 155 The analysis utilizes a binary logit model to identify factors that influence the probability of a paddy 156 processing unit marketing its products within the Senegal River Valley1. The dependent variable (BF) is binary, 157 taking the value 1 if the unit commercializes within the valley and 0 otherwise2. 158 The explanatory variables include3: 159 □ Monthly processing capacity (M)444. 160 □ Marketing difficulties (BI)555. 161 □ Existence of an inter-professional official price (T)666. 162 □ Market price level (U)777. 163 □ Supply structure shares, specifically individual producers (AC), economic interest groups (AD), 164 producer unions (AE), and aggregators (AF)888. 165 □ Main product purchased (AV), introduced

via indicator (dummy) variables999. 166 The model is specified as follows10: 167

 $$\text{logit}(P_i) = \ln \frac{P(BF_i = 1)}{1 - P(BF_i = 1)} = \beta_0 + \beta_1 M_i + \beta_2 BI_i + \beta_3 T_i 168 + \beta_4 U_i + \beta_5 AC_i + \beta_6 AD_i + \beta_7 AE_i \dots$$ 169 In this equation, $P(BF_i = 1)$ is the probability that unit i commercializes in the valley, and ϵ_i 170 represents the random error term11. The coefficients β_j measure the marginal effect of each variable on the 171 log-odds of commercializing locally12. Estimation is conducted using the maximum likelihood method, and results 172 are reported as raw coefficients and odds ratios to aid economic interpretation13. 173 4. Results and Interpretation 174 The estimated coefficients of the logit model are interpreted in terms of variations in the log-odds of 175 commercialization within the valley1. A positive value for a β coefficient indicates that the variable in question 176 increases the probability of the unit commercializing in the valley, whereas a negative value reflects the opposite 177 effect2. To facilitate interpretation, the coefficients are presented as odds ratios ($\exp(\beta)$)3. An odds ratio 178 greater than 1 suggests a positive effect on the probability of commercialization, while a value 3 less than 1 indicates a 179 negative effect4. 180 Average Marginal Effects (AME) are also calculated to express the impact of the explanatory variables on the 181 average probability of commercialization. This approach allows for the direct interpretation of results in terms of 182 probability points, which facilitates the economic reading of the findings. 183 4.1. Model Validation 184 The goodness-of-fit of the model is evaluated using the Likelihood Ratio (LR) test and McFadden’s Pseudo $R^2$1. 185 Predictive performance is measured by the Receiver Operating Characteristic (ROC) curve and the Area Under the 186 Curve (AUC)2. 187 The Hosmer-Lemeshow goodness-of-fit test is employed to verify the consistency between predicted and observed 188 probabilities3. Furthermore, potential multicollinearity among the explanatory variables is examined using Variance 189 Inflation Factor (VIF) indices4. 190 Finally, robust standard errors are estimated to correct for

potential heteroscedasticity or intra-group correlations 191 between units5. These various diagnostic checks guarantee 3 the reliability and stability of the estimated coefficients6. 192 4.2. Regression Results and Interpretation 193 Table 1 presents the results of the logistic regression aimed at explaining the probability of a processing unit 194 commercializing its products within the valley. The estimated coefficients are provided in both log-odds and odds 195 ratios, accompanied by their respective significance levels. 196 The analysis reveals that processing capacity is the most significant determinant: each additional ton processed 197 significantly increases the probability of local commercialization. This finding highlights the advantage of larger 198 units, which are generally better equipped, better structured, and more integrated into the economic circuits of the 199 valley. 200 Conversely, marketing difficulties negatively and significantly affect the probability of selling rice within the valley. 201 Units facing logistical constraints, unstable demand, or increased competition are therefore less likely to sell their 202 products locally. Finally, 5 the fact that white rice is the most sold product exerts a significant positive effect: the 203 strong local demand for white rice makes it a lever for commercial integration for processing units. 204 4 On the other hand, variables related to prices (official prices set by the interprofessional organization or market 205 prices) show positive but insignificant effects. This lack of significance suggests that price variations still have very 206 little influence on marketing decisions at this stage. Similarly, the share of suppliers (individual producers, economic 207

 interest groups, unions, aggregators) does not have a statistically significant effect, indicating that the supply 208 structure is not yet a determining factor in the decision to sell locally. 209 Overall, the analysis highlights three major determinants of commercialization within the valley: 210 □ Processing capacity. 211 □ The absence of marketing difficulties. 212 □ The predominant sale of white rice. 213 Variable Coefficient (β) Odds Ratio p-value Interpretation Constante -2,1 0,12 0,08 M (monthly capacity) 0,07

1,07 0,03* Positive and Significant Effect BI (marketing difficulties) -1,2 0,3 0,04* Negative and Significant Effect T (official price) 0,6 1,82 0,18 Positive but nonsignificant effect U (market price) 0,25 1,28 0,32 Positive but nonsignificant effect AC (individual production) 0,01 1,01 0,12 Weak effect AD (GIE) -0,02 0,98 0,22 Weak effect AE (unions) 0 1 0,95 No effect AF (aggregators) 0,01 1,01 0,6 Insignificant effect AV_white rice 1,1 3 0,02* Positive and significant effect * : significant at the 5% level 214 These results are consistent with existing literature. The positive influence of processing capacity aligns with the 215 findings of Njiti et al. (2023) in Cameroon, which demonstrate that larger processing units enjoy easier access to 216 local and regional markets. In Senegal, Ndiaye (2017) similarly highlights the decisive role of technical investments 217 in securing access to commercial outlets. 218 The negative impact of marketing constraints is in phase with the observations of Kouman (2024) in Côte d'Ivoire, 219 who argues that logistical limitations, irregular demand, and competition severely restrict the local distribution of 220 processed products. 1 These findings underscore the necessity of improving market organization, transport, and 221 stakeholder coordination to bolster the overall performance of the value chain. 222 The significant positive impact of white rice sales as the primary product further corroborates the findings of 223 Demont and Rizzotto (2012), who emphasize the high economic value of white rice in local markets and its pivotal 224 role in regional demand. Conversely, the lack of significant effects from price variables reflects the work of Soulé et 225 al. (2020), which suggests that discrepancies between official and market prices still have limited influence on 226 economic behavior in contexts where regulation remains partial and frequently bypassed in practice. 227 Furthermore, 4 the absence of a significant effect regarding the share of various suppliers aligns with the results of 228 Cissé and Diagne (2018), demonstrating that procurement structures remain poorly formalized and inadequately 229 regulated, thereby limiting their actual influence on marketing decisions. 230

X(X), XX-XX 9 Overall, these results indicate that enhancing the technical capacities of processing units and mitigating commercial 231 and logistical obstacles represent the primary levers for strengthening stakeholder integration within the local value 232 chain. At this stage, price variables 4 and the nature of suppliers appear to be secondary factors; however, they may 233 become more influential as contractual mechanisms and sector regulations are progressively strengthened. 234 5. Discussion 235 The results of the logit model confirm that processing capacity is the primary factor influencing rice 236 commercialization in the Senegal River Valley. Processing units with higher capacities demonstrate a significantly 237 greater probability of selling their products within the valley. This advantage stems from several mechanisms: 238 economies of scale, reduction in unit costs, supply consistency, and enhanced integration into distribution networks. 239 This finding aligns with trends observed in the region, notably the case of the Compagnie Agricole de Saint-Louis 240 (CASL), whose modern infrastructure—capable of milling and storing up to 60,000 tons per year—has strengthened 241 the integration of local producers into regional commercial circuits (CASL, 2025). 242 Conversely, marketing difficulties exert a significant negative effect on the probability of local sales, highlighting 243 the structural constraints affecting the rice value chain. These obstacles include logistical limitations, insufficient 244 storage capacity, a lack of stable outlets, and a persistent reliance on informal intermediaries. These observations are 245 consistent with reports from SODAGRI (2025), which suggest that irregular distribution channels and the absence of 246 reliable commercial platforms increase the economic vulnerability of processors. 247 The economic importance of white rice is further validated, showing a significant positive effect on the probability 248 of local commercialization. Sustained demand for white rice in the urban and peri-urban areas of the Delta 249 establishes it as a strategic product for processing units. This dynamic aligns with the priorities of the National 250 Strategy for Rice Development (2024), which emphasizes the development of competitive local white rice to reduce 251 import dependency. 252 In contrast, price-related variables—whether the official price set by the inter-professional body or the market

253 price—are non-significant. This result suggests that commercialization decisions are driven more by the operational 254 capacity of the units than by price signals. This trend aligns with recent observations by Inter-Réseaux (2025), which 255 indicate that market distortions and the low formalization of trade reduce the influence of price mechanisms within 256 the Senegalese rice sector. 257 Similarly, the lack of significant effect from various supply structures (individual producers, GIEs, unions, 258 aggregators) reveals a lack of differentiation in the procurement strategies of processing units. This situation 259 highlights the weak formalization of commercial relations within the sector, which still relies heavily on informal 260 arrangements. Furthermore, the MAER (2024) emphasizes the necessity of strengthening contractualization and 261 developing inter-professional organizations capable of better stakeholder coordination. 262 In summary, the results highlight three major levers for strengthening the commercialization of processed rice 263 within the valley: 264 □ Enhancing the technical and operational capacities of processing units; 265 □ Mitigating logistical and commercial constraints; 266 □ Further promoting local white rice 1 as the primary driver of regional demand. 267 6. Conclusion and Policy Recommendations 268 The study demonstrates that the commercialization of processed rice within the Senegal River Valley is highly 269 contingent upon the technical capacities of processing units and their ability to mitigate logistical and commercial 270

 bottlenecks. The results indicate that larger units—characterized by superior equipment and production 271 consistency—achieve better integration into local markets. In contrast, smaller units remain marginalized due to 272 limited capacity, frequent equipment failures, high operational costs, and the lack of stable market outlets. 273 The sustained demand for white rice emerges as a critical lever for dynamizing the sector. However, efforts 274 regarding standardization, packaging, grading, and quality enhancement must be intensified to enable local white 275 rice to compete effectively with imports. While price signals and procurement structures currently play a secondary 276

role, the enhancement of regulatory frameworks, contractualization, and inter-professional coordination remains 277 essential for ensuring sustainable commercialization. 278 In light of the findings, several strategic recommendations emerge: 279 1. Strengthening the Technical Capacities of Processing Units 280 o Facilitate access to tailored financing (seasonal credit, equipment leasing, guarantee funds). 281 o Promote the modernization of facilities and the implementation of regular equipment maintenance 282 programs. 283 o Encourage the emergence of regional processing hubs capable of pooling storage and transport costs. 284 2. Improving Logistical Infrastructure and Marketing Mechanisms 285 o Develop regular and formalized market platforms 286 o Invest in storage, drying, and preservation infrastructure 287 o Implement logistical frameworks capable of reducing transport costs and minimizing post-harvest 288 losses. 289 3. Promote local white rice and strengthen its competitiveness 290 o Continue efforts toward standardization, packaging, and labeling 291 o Promote territorial marketing that highlights the unique qualities and freshness of local rice 292 o Consolidate collaborations between processors, distributors, and institutional actors to enhance the 293 product's market visibility 294 4. Structuring and Formalizing Relations Between Stakeholders 295 o Develop more formalized sales, procurement, and production contracts 296 o Strengthen inter-professional organizations to ensure improved price regulation and effective 297 coordination 298 o Foster partnerships between producers, processors, and financial institutions 299 Ultimately, the sustainable competitiveness of the rice sector in the Valley depends less on price adjustments and 300 more on a technological, organizational, and logistical upgrade. The consolidation of processing units and their 301 integration into local markets are essential conditions for strengthening food sovereignty and driving inclusive 302 economic dynamics in Senegal. 303 304

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