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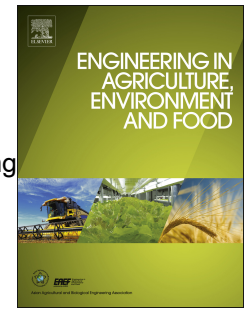

Measurement accuracy of the area of combine-harvested field sections corresponding to a truckload of grain received at a grain elevator

Y. Hirai, K. Tanaka, T. Nakanishi, T. Shikanai, E. Inoue, T. Okayasu, M. Mitsuoka

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Y. Hirai • K. Tanaka • T. Nakanishi • T. Shikanai • E. Inoue • T. Okayasu • M. Mitsuoka

Y. Hirai • E. Inoue • T. Okayasu • M. Mitsuoka
Faculty of Agriculture, Kyushu University, 6-10-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan
email: hirai@bpes.kyushu-u.ac.jp
K. Tanaka
Saga Agricultural Cooperatives, 2-1 Sakae-cho, Saga 840-0803, Japan
T. Nakanishi
Department of Electronics Engineering and Computer Science, Fukuoka University, Nanakuma 8-19-1, Jonan-ku, Fukuoka 814-0180, Japan
T. Shikanai
Faculty of Agriculture, University of Ryukyus, 1 Senbaru, Nishihara-cho, Nakagami-gun, Okinawa 903-0213, Japan

ABSTRACT Measuring the area of combine-harvested field sections corresponding to a truckload of grain received at a grain elevator (LHA: load harvest area) allows the estimation of brown rice yield. The objective of this study was to evaluate the accuracy of LHA measured based on combine movement traces when the traces were recorded by a GPS or a GPS+Quasi-Zenith Satellite System (QZSS) receiver. For the measurements using a GPS receiver, the mean and standard deviation of relative errors of LHA were 4.7 % and 8.1 %. The center of the relative error distribution shifted toward positive because positioning errors of a GPS receiver shifted outer edges of harvested sections outward and resulted in measuring larger harvested area than a true value. For the measurements using a GPS+QZSS receiver, the mean and standard deviation of relative errors of LHA were 0.5 % and 4.8 %. The center of the relative error distribution was around 0 % for its better positioning accuracy. The relative errors of LHA tended to be large when an LHA was measured from a field section where only the outer-part of a field is harvested or several small harvested sections. These cases of LHA measurements increased the sum of the perimeter of harvested sections and resulted in deteriorating the measurement accuracy. This result indicated that measurement accuracy of LHA can be further improved by correcting error, which can be estimated based on positioning errors and the perimeter of harvested sections.

Keywords:
Brown rice; GPS; Harvest area; Movement traces; Quasi-Zenith Satellite System; Yield monitoring