



## OPTIMAL VEHICLE ROUTING SYSTEM FOR RELIEF GOODS DISTRIBUTION IN THE 4TH DISTRICT OF NUEVA ECIJA, PHILIPPINES

Allen L. Nazareno<sup>1\*</sup>, Reychele R. Alberto<sup>1</sup> and Princess U. Gatuz<sup>1</sup>

<sup>1</sup>Institute of Mathematical Sciences, and Physics, College of Arts  
and Sciences, University of the Philippines Los Baños

\*Corresponding Author: [allennazareno@gmail.com](mailto:allennazareno@gmail.com)

**ABSTRACT** – Being a lowland province, Nueva Ecija experiences massive flooding during typhoons. This causes the residents to be stuck in their homes without enough food and personal care items. To relieve such problem, the local government delivers relief goods to every barangay. However, there is no existing system to follow in the implementation of the said activity. Hence, an efficient system in delivering the relief goods was developed in this study. In particular, this paper provides a set of routes for relief goods distribution such that the demands of all the barangays in the 4th district of Nueva are served and total travel time is minimized. This problem is classified as a Vehicle Routing Problem (VRP), an NP-hard problem. Primarily, Clarke and Wright's Savings Algorithm (CW) was used in determining the set of routes. The Improved Clarke and Wright's Algorithm (ICW) was then used to further improve the primary solutions derived from CW. ICW is a hybridized version of CW which makes use of tournament and roulette wheel selection. On the average, the ICW reduced the total travel time by 1.36%. Furthermore, a computer program called "iCW solver" was created for the implementation of the algorithms which can also be used to obtain vehicle routing system for other localities. With an efficient routing system, it can mitigate the loss of lives and devastating effects to humans during disasters brought about by natural calamities.

*Key words: vehicle routing problem, relief distribution, improved Clarke and Wright's Savings algorithm*



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