

Klaus-Herbert Rolf and Almut Lohmeyer, Bielefeld

New logistic solutions in agriculture

From growing through to processing: transparency and efficiency through computer-supported fleet management

The purchase of modern agricultural machinery is associated with enormous investments. It is all the more important, therefore, for farmers and agricultural service organisations to achieve the optimum machinery exploitation. Machines should be operating productively as long as possible each day – with integrated data documentation and short transport and down-times. Here, the agricultural contractor needs the support of operator-oriented information systems to allow full control of operations even during peak times of the season.

Increasing efficiency, heightening quality, guaranteeing data security – without the help of computers, today's logistic demands in agricultural service businesses are hardly able to be met. But just how much information technology is necessary? How much is practical? The most different requirements in larger and smaller farms regarding the planning and carry-out of operations have an influence on the type and size of the hardware systems and the software to be installed. Thus, the manual documentation and operational administration possible with a module integrating yield or field mapping is certainly sufficient for a few small and medium-sized enterprises. However, the disposition of larger enterprises requires, as a rule, functions that go above and beyond this for the recording, processing and evaluation of information. In such cases, modern applications offer many possibilities. As modular-built systems they can take account of the individual requirement profile of the single business – inclusive of online options between vehicles and office, graphic visualisation of the field and vehicle management, quantity and quality analyses according to whatever criteria is chosen as well, as well as

offering interfaces to linked systems for cost calculations and financial accounting.

Administration without redundant data recording and storing

A clear overview and the simple processing of customers and their jobs support the whole operation from agreement on individual conditions for the customer over planning and realisation through to invoicing and financial accounting. Details of clients and jobs need only be entered once and are then carried further without mistakes as the job develops. On the one hand, this secures the smooth execution of the job in hand and on the other, prepares the foundation for important evaluations. Often, not all job-relevant information is available during initial planning, or it might not have been able to be determined at that time. A job is finally fully planned only with the final classification of resources (machinery and personnel) and determination of operation dates. The graphic operational plan shows operational and non-working time for machinery at a glance. These signs, classified according to resources or job, make possible a clear overview of all work. Operational control follows from the overlapping visualisation of the work progress. The possibility of direct comparison between planning and the actual carrying out of the work allows gaps between what has been done and what should have been done to be recognised in time and urgent alterations to be made. The demands from the customer side for fast, complete and yet still individual evaluations can be met with a three-stage reporting system.

Linking business operations in office and field

Especially in the growing season, planners

Klaus-Herbert Rolf is marketing manager of AGRO-COM GmbH & Co. Agrarsystem KG, Potsdamer Str. 192, 33719 Bielefeld; e-mail: rolf@agrocom.com. Almut Lohmeyer is a freelance business journalist

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Fig. 1: Transparent farm operations.....





Fig. 2: ...on the field...

find themselves permanently under pressure through the requirements for preparing large numbers of drivers, auxiliary labour, tractors, machines and implements and co-ordinating them with regard to variable and spontaneous influence parameters such as weather or changed client wishes. The possibility of sending information and job instructions to the drivers online over radio, as well as of receiving the actual performance data in the reverse direction by the same method, makes it easier for the contractor to organise the operations of, and the billing for, his vehicles back in the office. In this way valuable time can be spared. A topographical map with the machines blended into it informs in real time on operational location and working condition of the units. Thus, occurrences which are not able to be foreseen can be reacted to at once and, where required or where the customer wishes, rapidly and directly re-planned. Technical requirements: On the machine, a mobile on-board computer which on the one hand exchanges information with the main administrative computer and, on the other, is linked to the machinery control of the respective unit. This on-board computer can be fitted onto the most different machines. All that is required is a suitable docking station installed on the vehicle.

Self-determination in data collection

Specially useful for data management on the field is the additional flexible display of analogue and digital data in the farm machine. A large selection of different machine conditions are stored via the on-board computer. Some signals are permanently applied, some can be individually applied by the operator. This can apply e.g., via a simple switch to determine the sites of larger stones in the field: obstacles which can be easily overseen during harvest and which can cause great da-

mage to the combine. In another case, the quality of the work being carried out is of interest, on the one hand as evidence for the customer and on the other, for long-term optimisation of the harvest. In vegetable production this could, e.g., include the cutting height for spinach. According to the points of interest, such a system stores further data, for instance pto, rpm, forward speed, three point hitch setting, machine on/off or area performance. All recorded details can be classified according to event or time, and also run parallel to other functions of the board computer such as yield mapping, soil sampling or fertilising without influencing the efficiency of either application. This data would be then all stored on a chip card and simply transferred into the office PC. It is then available for individual farm management analysis with standard table calculation programs such as Excel, or geographical information systems (GIS) e.g. digital map material. Exemplary evaluations calculate the actual effective working time and indicate the travelling and down-times.

From job execution to job management

With the help of a logistic computer system, important information for business control can be drawn from data. At the press of a button evaluations are on offer that contain a lot of important information with regard to available drivers, machines and customers. How often and how reliably has a particular driver been working? What was the quality of the work? To what extent is the machinery being exploited, what is its technical condition? What customers have allowed which particular jobs to be carried out for them, and how often in the last years? Here, the enormous working potential released by logistic information systems with regard to quality assurance, customer relationships and marketing planning becomes apparent.

Defining own requirement profile and targeting investments

Logistic information systems pay for themselves through their business management utilisation. That is why it is of great importance to analyse possible profitability of the investment right at the start. This advisory service is directly offered by organisations such as AGROCOM. From the AGROLOG modules planning, monitoring, discovery and geodiscovery an individual software package can then be put together – naturally with the option of extending the whole system by adding more functions later.

Summary and outlook

Logistic information systems which are customised for a particular business are in the position to release a large variety of efficiency and quality potential. But when one takes a look at the whole logistic chain from field cultivation to factory processing, such information systems are still capable of further development. Limitations to solutions are defined nowadays mostly through the fact that the process chain seldom lies in a single entrepreneurial hand. Organisations such as AGROCOM are, however, already working on solutions towards the networking of communications between agricultural service organisations and processing enterprises. Target is co-ordination of the whole operation planning with everything involved within a single system and through this optimise in a sustainable way.



Fig. 3:and in the office are the target