

# Land Consolidation as a Tool for Flood Prevention

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**Key words:** land consolidation, environmental protection, flood prevention, public private co-operation, disaster management

## SUMMARY

Flood catastrophes along German rivers have always appeared, but their number has increased as well as the disasters they cause. The German state Brandenburg has initiated different measurements along the rivers Oder and Elbe for sustainable flood prevention. Firstly some dykes were strengthened and/or raised. Additionally it was considered to create specific flood areas by setting back dykes. As a first project of the latter the Elbe dyke at Lenzen was planned to be set back to win about 600 ha land for retention.

As a main precondition for this project the needed land had to be taken into public ownership. More than 60 private owners were affected. Because many of them refused to sell their land, a land consolidation project was started. This enabled not only to get hand on the needed land but to strengthen the agricultural production in the area and to include aspects of nature conservation, municipality needs and tourism as well. The project was started in 2000 parallel to the planning process of the resetting of the dyke. After negotiations with about 520 owners of in total 3,500 ha about 160 owners throughout the whole project area offered to sell their land. Merging these plots and the already state owned properties in the new flooding area saved the directly affected owners who didn't want to sell from expropriation by reallocating their properties to the back side of the new dyke. The heavy difference between owners and public authorities was solved smoothly. As a result the structure of ownership in the whole area was improved. A project plan for improvement of infrastructure, nature conservation and village renewal was developed in parallel. The implementation of this project plan on property level made the land consolidation a really comprehensive measurement.

In August 2005 the construction work for the new dyke was started. It is planned to break the old dyke in 2008. Then the biggest project of that kind in Germany will be completed and might be a model for similar future projects.



**Fig.1:** at low watermark



**Fig. 2:** flood

## 1. INTRODUCTION/PREVIOUS HISTORY

The 'Lenzen/Elbtalaue' land readjustment procedure is one of the most ambitious land consolidation projects in the Federal State of Brandenburg. In a complex moderation and planning procedure the different interests of nature conservation and environmental protection, flood protection, agriculture and rural tourism are reconciled with each other. It is also an excellent example of successful co-operation between public administration and a private, explicitly economically orientated planning company.

The Lenzen Elbtalaue is one train hour away from both Hamburg and Berlin. The River Elbe shapes the face of the landscape with its natural interchange between low water and flood, that occasionally also achieves threatening and, as in the summer of 2003, catastrophic proportions. It is a jewel for nature lovers, a unique retreat for many animals and plants which have become rare throughout Europe. This is not least attributable to the location in the middle of Germany. The German domestic border ('Iron Curtain') ran for decades where today bridges and ferries cross the River Elbe. What for humans was an insurmountable barrier, was for nature an undisturbed retreat. Since 1997 the Elbe river landscape is therefore protected as a UNESCO biosphere reservation.



**Fig. 3:** former floodplain forest



**Fig. 4:** ...in present time

Originally, the Elbtalaue was a forest-dominated landscape. Extended floodplain forests covered the flood areas. Today only a few small examples remain of these strictly protected virgin forests that are rich in species. They provide the homeland to the Elbe beaver and offer species such as black stork, crane or eagle an ideal breeding ground.



**Fig. 5:** black stork



**Fig. 6:** crane

In order to create more space for the river to flood, the existing Elbe dyke is currently being set back and new floodplain forest planted in the Lenzen Elbtalaue in a model project unique to Germany. About 600 hectares of floodplains are returned to the river in this way.



**Fig. 7:** iron curtain

Up to 1989 the German domestic border characterised the region. Economic development stagnated as a result of building the Wall. The region continues to suffer from a weak economy, a high level of unemployment and a decreasing population. The share of agricultural workers is relatively high.

The large-scale conservation project has benefited from the fact that the existing dyke was in need of rehabilitation anyway and that funds earmarked for this can now be used for the more ambitious setback dyke project.

In addition to these two aspects, factors of improving the agricultural structure were decisive in ordering the land consolidation procedure: In the preparatory phase for the setback dyke project in the mid nineties, many applications were made from the region for a reorganisation of ownership status in accordance with the Agricultural Adaptation Law (LwAnpG). This law regulates amongst other things official procedures to reorganise ownership status as a result of 40 years of collective cultivation of the land by socialist collective farms under GDR conditions.

When in 1995, as part of an EU LIFE project, work began on acquiring land for the requisite flood and dyke areas, the land consolidation authorities decided to support the project with a land consolidation procedure. The responsible office in Neuruppin started work on preparing for the procedure in 1997. On the basis of information and analyses of the status quo in the local communities of Lenzen, Lanz, Lütkenwisch, Gandow and Wustrow and under consideration of the applications for the reorganisation of ownership status in accordance with the LwAnpG a land consolidation requirement with very high priority was determined.

As part of the improvement measures (improvement of the agricultural infrastructure, in particular of the land by irrigation and drainage) in GDR times, the land cultivation structure in this region was greatly changed by the socialist collective farms. Primarily in this connection but also due to the erection of the border installations, large parts of the old path network were eliminated and a new path network arose without consideration of the ownership status of the land; this primarily served the new large-scale farming structures. In the procedure area in GDR times 32.4 km of paths were eliminated and 8.6 km replaced.

The ditch system was altered to an even greater extent. Here too the ownership status was ignored to eliminate and fill 33.3 km of ditches. In return a new ditch system with a length of 43.3 km ditches was installed. These measures substantially impaired the land parcel structure by cutting up the land and cutting it off from the existing path network. Furthermore, the construction of the border installations was accompanied by a large-scale clearing of important landscape elements near to the Elbe (= near to the border).

As part of the restructuring of the agricultural enterprises in accordance with the LwAnpG several farms of quite different sizes arose in the procedure area with areas from 14 hectares to 1,380 hectares. They filed applications for determination and reorganisation of the ownership status pursuant to Section 53 et seq. LwAnpG. It was only possible for these enterprises to work their fragmented own and leased areas on the basis of extensive plough exchange agreements (exchange of leased land). Such agreements always have conflict potential which was to be eliminated by a land consolidation procedure.

The most important objectives in terms of agricultural structure for the land consolidation procedure were as follows:

- Development of new parcels of land with paths in order to facilitate sale and leasing. (Restoration of disposal of ownership pursuant to Section 1 LwAnpG).
- Reorganisation of ownership of paths and ditches on foreign plots.
- The bringing together of widespread holdings under consideration of the leasing relationships as far as possible to create contiguous agricultural units.
- The regulation of the ownership relationships in the villages.
- The planning, promotion and implementation of measures of path constructions for the development of land parcels and of village renewal measures.

The biosphere reserve administration 'River Landscape Elbe-Brandenburg' required the land consolidation for the intended setback dyke project to regroup the lots already purchased and – if possible – to get hold of additional areas to the requisite extent. The Federal State of Brandenburg had already acquired 475 hectares, but only approximately 50 % were situated in the planned setback area.

The preparatory work for the ordering of the land consolidation procedure Lenzen/Elbtalau was completed in autumn 2000. The procedure area was demarcated after hearing the responsible authorities and planners and flown over in autumn 2000 to make photos from the air.



Fig. 8: Protests

Hearings of the land owners involved showed that the planning of the setback dyke project was not without dispute. Particularly the withdrawal of approximately 500 hectares of working agricultural area as part of the large-scale nature conservation project was criticised. The region in which the setback dyke project is planned has met with protest. The 'X' that is found to differing extent in the region stands for: 'We object'. In the past this usually referred to the nuclear waste store in Gorleben. The (now successful) resistance to a national park in

Lower Saxony also shows that when it comes to nature conservation nothing can be done against the will of the population. The land consolidation with the possibility to reorganise the areas according to requirements decisively contributed to solving conflict in this case.

## **2. COOPERATION WITH PRIVATE PLANNING COMPANIES**

The Agricultural Adaptation Law permits to an unusual extent the transfer of public administrative tasks of land reorganisation to private planning companies and engineering offices. Use was also made of this possibility in the land consolidation procedure of Lenzen/Elbtalaue. Existing positive empirical reports on the involvement of private parties were also fully endorsed in this procedure. It was demonstrated that the private sector framework conditions of the free planning companies and engineering offices favour a high level of flexibility and innovation in the procedure. As this case, this can also lead to a substantial acceleration of the procedure. The public administration is subject to enormous consolidation requirements with respect to staffing levels. Precisely with this in mind it would be greatly welcomed if the expertise acquired by private planning companies could be maintained for the good particularly of the land owners affected as an additional planning instrument which is so important to the rural region.

## **3. THE LAND CONSOLIDATION PROJECT LENZEN / ELBTALAUE**

As a result of the preliminary activities and the agrarian structure development planning (as described under item 1) the land consolidation project Lenzen / Elbtalaue was started with official order from 16<sup>th</sup> November 2000. Covering an area of in total about 3,500 hectares the project was started based on § 56 LwAnpG and § 86 Land Consolidation Law (Flurbereinigungsgesetz) as the legal frame. The property of about 520 land owners had to be readjusted under consideration of a plan of road and water system that had to be established in advance.

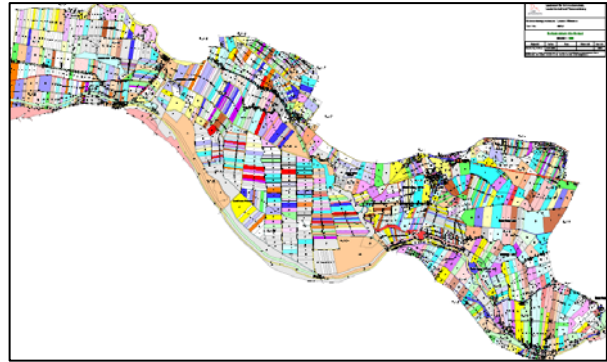
Main objectives of the project were

- to reorganize land ownership in accordance to the landscape and infrastructure that has been built during 40 years of socialism and
- to solve the conflicts between farmers, nature conservation, municipality interests, tourism, fisheries, hunt, traffic, energy supply and - most important here – flood prevention

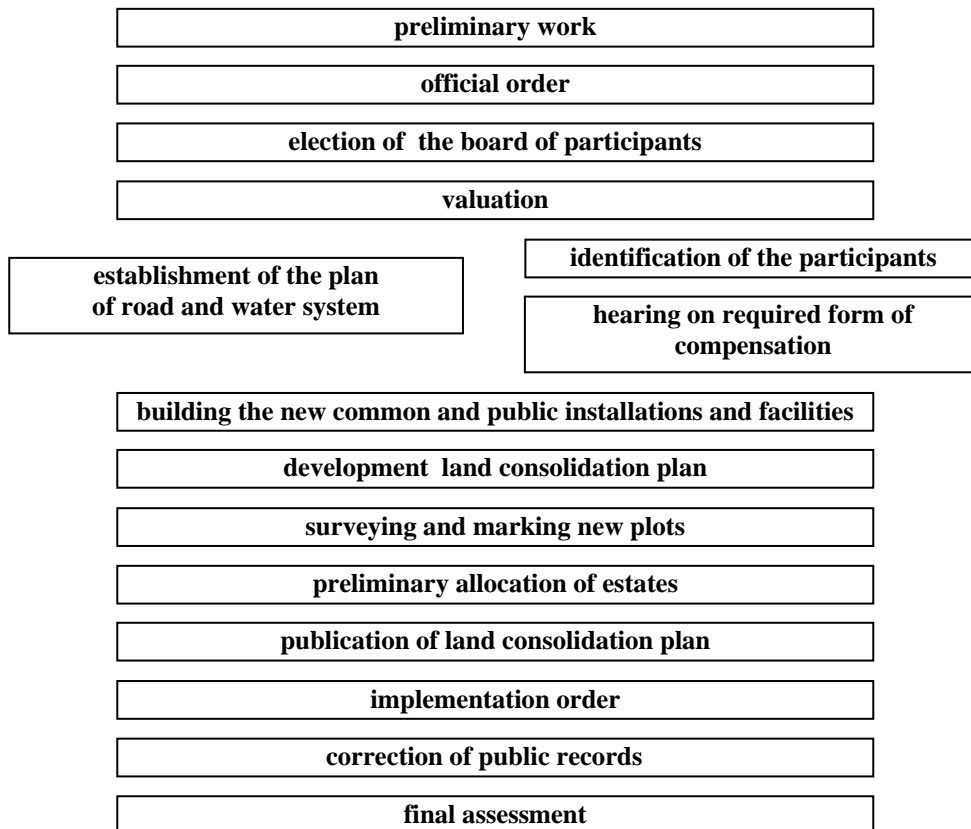
with the tools of land consolidation in a most sustainable manner. The biggest challenge was of course to achieve relinquishment of allocated land from as many owners as possible to get about 600 hectares of land for the new flooding area.



**Fig.9:** the run of the new dyke



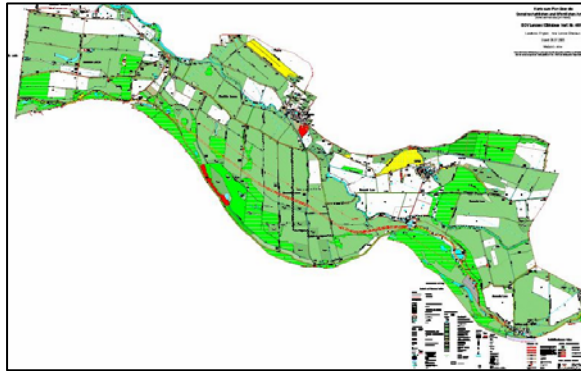
**Fig.10:** map of ownership before land consolidation



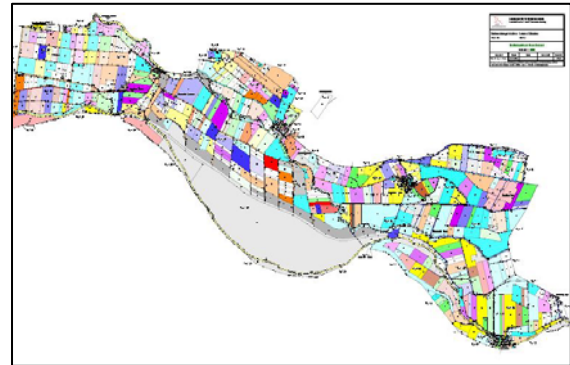
**Fig. 11:** German land consolidation in principle

Having elected the responsible persons for the board of community of participants – a body with strong decision-making powers – the valuation process for all plots was started. The agricultural land was evaluated by sworn valuation experts and the board of participants with respect on the normal return and the exchange value. For plots of land for building and already built up areas the market value was determined. Finally the assessment of the results of the evaluation took place and formed the platform for all land exchange operations during the project.

As the next step the plan of road and water system was developed in a joint procedure with the board of participants. This plan included all details of the intended road and water constructions, nature conservation projects, village renewal projects, improvement of public infrastructure and projects for tourism (yacht harbour) as a result of intensive coordination with all representatives of common interests. The determination of the plan for the new dyke was done by the responsible state authority of Brandenburg separately. The result was included in the Lenzen project plan by copy.



**Fig.12:** project plan Lenzen



**Fig.13:** map of ownership after land consolidation

At current realisation of the project plan is running. About 14 km roads, 2.7 hectares hedges and 25 hectares retention areas along small tributary rivers to the Elbe turn into reality. In total the investment will be about 1.5 million Euro, 90% supported by federal government and the state of Brandenburg. The participants are in charge for 10% of the investment. The new dyke project is financed totally by public authorities.

As mentioned before the state of Brandenburg had already purchased a lot of single plots within the area (475 ha). Many owners from the target region for flood prevention however didn't agree to sell. Negotiations with all 520 owners located in the land consolidation area resulted in agreements with about 160 owners to sell another 470 ha. Merging the claim for about 600 hectares in the new flooding area by land exchange saved the directly affected owners who didn't want to sell from expropriation by reallocating their properties to the back side of the new dyke.

The total amount of land purchase was even more than the needed 600 hectares for the new flooding area. As a result this additional land was ready to be used for realization of other objectives.

After the assessment of the dyke project a preliminary allocation of properties was enacted by the land consolidation authority. Through this the construction of the about 6.5 km long new dyke started as early as possible before the final stages of the land consolidation.

In August 2005 the Minister for Environment of the Federal Republic, the Prime Minister and the Minister for Agriculture of Brandenburg turned the first sod for the biggest flood prevention project in Germany.





**Fig.14:** turning the first sod

The dyke construction will be finalised in 2008. Then the old dyke will be sectional opened at several breaking points. During floods this will considerably help to lower the water level and to avoid flood disasters.

Improvement of nature conversation will be a result of this project as well. By revitalisation of hardwood floodplain forest an important contribution to the European network „Natura 2000“ will be achieved. The area will be summer habitat for breeding birds and resting place for migratory birds.

The results of the land consolidation project Lenzen/Elbtalau will be finally presented to the participants at the end of 2006. The change of ownership will be in 2007. Then all constructions for the new common and public installations and facilities will be completed.

#### **4. OUTLOOK**

Land consolidation as a tool for conflict solutions between flood prevention and land owners proved to be very good. Without accompanying official land management the project would have been impracticable. Not a single owner had to be expropriated to realize the necessary flood prevention, that was absolutely required after the tremendous flood catastrophes the years before. Quite the reverse: Having more than 160 voluntary relinquishments it was possible not only to secure the requirements of the dyke project but for other demands as extension of farming companies, improvement of a yacht harbour, protection of retention areas along small rivers and land management for municipality interests as well.

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## BIOGRAPHICAL NOTES

### Dr. Andreas Drees

Studied geodesy in Bonn from 1974 to 1979. After a two-years traineeship in civil service he set up as a licensed surveyor in Münster in 1983 with working fields in cadastre and urban land consolidation. Up to now he is manager of 7 urban land consolidation boards.

1985 Drees received a doctor's degree in the field of close range photogrammetry at Bonn University, where he gives lectures on land management at current.

Since 1992 Drees is sworn property valuation expert. He is member of several local valuation boards and the upper board of the state of Northrhine-Westfalia, too.

1993 Drees was authorized from the State of Brandenburg to carry out rural land consolidation measurements with full responsibility, since 2001 also in Thuringia.

Since 1983 activities in the committees of BDVI, German Association of Public Appointed Surveyors, and DVW, German Society for Geodesy, Geoinformation and Land Management (in both member of the board for many years), 1987-1998 editor of the German surveying magazine FORUM. At current FIG Vicepresident (2003-2006).

### Rainer Sünderhauf

Studied law in Freiburg/Br. and Göttingen from 1977 to 1983. After a three-year legal clerkship at Appellate Court of Brunswick lawyer in Hamburg. From 1992 to 2004 civil servant in the Brandenburg Ministry of Agriculture, Environment and Spatial Planning. Since 2004 head of department of land consolidation and rural development in the State Office of Consumer Protection, Agriculture and Land Consolidation, Brandenburg.

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