

Salt Partners

Mechanical solar salt harvesting worldwide

Vladimir M. Sedivy MSc (Hons) Chem Eng, IMD
President
Salt Partners Ltd, Zurich, Switzerland

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Basic types of salt harvesting methods

- **Manual harvest by hand and manual transport**
- **Manual harvest with tools and manual transport**
- **Manual harvest with tools and mechanised transport**
- **Mechanised harvesting and mechanised transport**

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Locations covered in this presentation



Mexico
Portugal
Bulgaria
Greece
Namibia
India
China
Australia

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Salt harvesting by bare hand



In Ghana, the most primitive salt harvesting method - by bare hand - is still being practised today.

MARIA ROCK

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Salt harvesting in Portugal

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Salt Partners Ltd, Zurich, Switzerland



In Portugal, salt is still harvested using an ancient method brought in by the Arabs in the Middle Ages.

However, also semi-mechanised and fully mechanised harvesting techniques are employed in modern saltworks.

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Manual harvest and mechanised transport



In Bulgaria, the transport of the harvested salt has been mechanised but the salt is still being harvested by hand.

Two belt conveyors bring the salt to a slurring vessel mounted on a tractor.

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Hydraulic transport of salt slurry



Hydraulic transport lines.

One pipe carries the slurry, the other line brings the transport brine back to the slurrying vessel on the tractor.

Men push the lines mounted on wide wheels.

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Salt washing plant on wheels



Salt slurry is discharged to a salt washing cone.

The overflowing transport brine is pumped back to the harvesting unit.

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Basic types of mechanical salt harvesters

- **Tractor driven or self propelled**
- **On wheels or on Caterpillar tracks**
- **Driving on salt bed or on crystalliser floor**
- **Cutting salt bed upwards or downwards**
- **Discharging onto belt conveyors or into trailers**

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Harvesting system in Yucatan, Mexico

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Salt Partners Ltd, Zurich, Switzerland



Tractor pulled harvester on double wheels drives with one side on the salt and with the other side on the crystalliser bottom. The harvester lifts the salt to a double wheeled trailer pulled by a truck driving on the salt bed.

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Harvesting system in Yucatan, Mexico

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The salt layer is first ripped (scarified) and then windrowed.

Salt floor is maintained on the crystalliser bottom.

The higher cost of multiple operations is optimised against the lower cost of equipment.

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Feeding system of the washplant in Yucatan



Salt is discharged from the trailers automatically, directly into the feeding hopper of the washing plant.

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Harvesting system in Kalloni, Greece



Kalloni saltworks operate a harvesting machine on Caterpillar tracks.

The machine drives on the salt, cuts the salt bed on the side and lifts the salt to belt conveyors.

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Kalloni salt harvesting system

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Salt Partners Ltd, Zurich, Switzerland



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The Kalloni harvesting operation is controlled by a man walking alongside the harvester. He adjusts the position of the cutting edge by a hand held controller.

Observe the salt layer being lifted from the mud floor by the cutting edge.

Salt is cut downwards, thrown upwards and lifted by a rubber belt to the belt conveyors.

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Kalloni salt transport system

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Belt conveyors bring the salt to a mobile bin driving on a causeway.

Dumpers transport the salt to the washing plant.

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Salt harvesting in Kalloni, Greece



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Messolongi harvesting system



At Messolongi in Greece, the harvester drives on the crystalliser mud bed.

The harvester cuts the salt in front of the machine and lifts the salt to a system of engine driven belt conveyors.

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Messolongi harvesting system



The cutting level is controlled mechanically by a plate sliding on the salt layer surface.

The salt is broken upwards and lifted to a belt conveyor.

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Salt harvesting in Messolongi, Greece



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Walvis Bay (Namibia) harvesting system



Walvis Bay salt harvesting system was supplied by ROV Durrant, Port Elizabeth, South Africa.

The harvester moves on Caterpillar tracks, both on the salt bed and on the crystalliser floor. Salt is loaded directly to the trailers.

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Walvis Bay harvester



Salt is cut by a rotating drum upwards and discharged to a chain elevator located behind the drum.

Cutting elevation is controlled by a laser.

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Salt transport at Walvis Bay



Wide wheel trucks with two trailers bring the salt from the harvester to the washing plant.

Salt is discharged from the trailers automatically through the bottom opening.

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Salt harvesting in Walvis Bay, Namibia



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Not always are salt harvesters successful



Example of a wrongly designed salt harvester that landed on the scrap yard.

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Conclusions

- **There are many salt harvesting systems in operation**
- **Which system is the best for you, depends on many factors**
- **Salt Partners experience is at your disposal**

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Vladimir M. Sedivy
Salt Partners Ltd, Zurich, Switzerland



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